

**THIRD FIVE-YEAR REVIEW REPORT FOR
DEL AMO SUPERFUND SITE
Operable Unit #1 and #2
LOS ANGELES COUNTY, CALIFORNIA**



PREPARED BY

U.S. Army Corps of Engineers, Seattle District

Approved by:


John Lyons, Acting Assistant Division Director

Superfund Site Cleanup Branch

U.S. Environmental Protection Agency, Region 9

Date:


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Executive Summary

This is the third Five-Year Review (FYR) of the Del Amo Superfund Site (Site), located in Los Angeles, California. The purpose of this FYR is to review information to determine if the remedy is, and will continue to be, protective of human health and the environment. The triggering action for this FYR was the signing of the previous FYR on September 24, 2010.

The Del Amo Superfund Site is located within the city of Los Angeles, California, in an area of the city referred to as the Harbor Gateway. The Site was the location of the Del Amo synthetic rubber plant, which consisted of three separate plants dedicated to the manufacture of styrene, butadiene, and synthetic rubber. Chemicals used in production at the Site contaminated the soil, and non-aqueous phase liquid (NAPL) is present at the Site. In addition, the plant used waste pits to dispose of wastes generated during plant operation. The main contaminants are benzene and naphthalene, although other volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs) are present. The Site was placed on the National Priorities List (NPL) in 1997.

The Site covers approximately 280 acres and has been redeveloped into a commercial/industrial park. A residential neighborhood is located south of the Site, with commercial and industrial buildings along the remaining sides.

The Site consists of three Operable Units (OUs): Soil and NAPL (OU-1), Waste Pits (OU-2), and Dual-Site Groundwater (OU-3). This FYR discusses only OU-1 and OU-2. The Dual-Site Groundwater OU (OU-3), which includes the Montrose Superfund Site, will be discussed in a separate FYR and will be completed concurrently with this FYR.

Operable Unit 1

The Record of Decision (ROD) for the Soil and NAPL OU was signed in 2011. The Environmental Protection Agency (EPA) selected a remedy with the following components to protect long-term human health and the environment:

- Institutional controls to include information outreach, building permit review, General Plan footnote, and restrictive covenants
- Capping for impacted shallow outdoor soil in four areas
- Building engineering controls (BECs) for VOC-impacted shallow soil under the building in one area
- Soil vapor extraction (SVE)¹ for VOC-impacted shallow outdoor soil in three areas
- SVE for VOC-impacted shallow soil under the building in one area (different than the BECs above)
- SVE for vadose soil in one NAPL-impacted area

¹ SVE is a common technology to remediate VOCs in soil, in which vacuum wells are installed in the ground to pull out contaminated vapors until target levels in the soil are achieved. Extracted vapors are treated using air pollution control technology to meet air pollution emission requirements.

- In-situ chemical oxidation (ISCO)² and SVE for deep soil and groundwater in NAPL-impacted groundwater contamination sources for three areas
- For future areas of contamination encountered during redevelopment and construction:
 - Excavation, or
 - BECs, capping, or SVE and
 - Restrictive covenants.

The remedy for OU-1 has not yet been implemented. A protectiveness determination of the remedy at Soil and NAPL OU cannot be made at this time until further information is obtained. EPA's understanding of vapor intrusion and indoor air sampling protocol has improved over the past five years. Given that the most recent indoor air data available is 20 years old, it is difficult to determine whether the occupants of the buildings are currently protected. EPA methodologies now recommend several sampling events representing different and/or conservative conditions

Further information will be obtained by assessing previous vapor intrusion evaluations in light of current guidance and collecting indoor air samples at on-site buildings of concern. It is expected that these actions will take approximately a year to complete, at which time a protectiveness determination will be made.

Operable Unit 2

The ROD for the Waste Pits OU was signed on September 5, 1997. EPA selected the following remedy to protect long-term human health and the environment:

- A Resource Conservation and Recovery Act equivalent cap
- Soil vapor monitoring
- Surface water controls
- SVE
- Security fencing
- Deed restrictions
- Long-term operation and maintenance

On August 13, 2002, an Explanation of Significant Differences (ESD) was signed. This ESD applies different Applicable or Relevant and Appropriate Requirements (ARARs) for a new absorption technology to treat extracted vapors from the SVE system.

On August 24, 2006, a second ESD was signed. This ESD describes the use of an in-situ bioremediation (bioventing) component of the SVE treatment system and estimates that this new system will require operation for approximately 10 to 15 years before cleanup goals are attained.

The remedy for the Waste Pits OU was performed in phases. Phase I was completed in 1999 and included the construction of the cap, installation of soil vapor monitoring probes, SVE wells, a cap gas

² ISCO is a remedial technology that oxidizes (chemically breaks down) VOC contaminants, converting them into nontoxic by-products, such as carbon dioxide and water.

system, security fences, deed restrictions, and surface and subsurface drainage features. Phase II occurred in 2006 and included the design and construction of the SVE/in-situ bioventing technology (IBT) system. Phase III includes an evaluation and redesign of the Phase II SVE/IBT system. The Phase III components have been constructed and are currently in operation.

Deed restrictions are in place for the waste pits, prohibiting inappropriate future land use or development.

For the Waste Pits OU, the remedy components are functioning as intended. The SVE/IBT system has been effective at preventing groundwater quality from being adversely affected by vertical contaminant transport through vapor migration. Additionally, VOC concentrations in groundwater at the Waste Pits OU are not increasing, and do not differ significantly from those trends seen throughout the broader Dual Site Groundwater OU. The cap gas system and the SVE/IBT system have been operating as designed; however, the 5 ppm_v standard for effluent VOC concentrations emission standard was established during the design in 1998 and may need to be updated using more current toxicity and modelling procedures. The reported results from the soil vapor monitoring wells around the perimeter of the Site have detection limits that are too high to indicate whether soil gas around the waste pits perimeter is a potential problem, although nearby residential sampling indicated that vapor intrusion may not be a significant source. Restrictive covenants are in place, preventing residential development and hospital or school/day care use. In addition, the exposure assumptions, and Remedial Action Objectives (RAOs) used at the time of the remedy selection are still valid.

The remedy at the Waste Pits OU is protective of human health and the environment. The cap is intact and the SVE system is working to prevent site vapors from entering into the groundwater. Institutional controls are in place that prevents exposures to Site contaminants. However, to be protective in the long-term, the SVE/IBT system and the cap gas treatment system emission standard need to be reviewed and updated, and the sampling plan for the perimeter wells needs to be revised to be protective of vapor intrusion.

Five-Year Review Summary Form

SITE IDENTIFICATION		
Site Name: Del Amo Superfund Site		
EPA ID: CAD029544731		
Region: 9	State: CA	City/County: Los Angeles/Los Angeles
SITE STATUS		
NPL Status: Final		
Multiple OUs? Yes	Has the site achieved construction completion? No	
REVIEW STATUS		
Lead agency: EPA		
Author name (Federal or State Project Manager): Dante Rodriguez		
Author affiliation: EPA		
Review period: October 2014 – September 2015		
Date of site inspection: November 14, 2014		
Type of review: Statutory		
Review number: 3		
Triggering action date: September 24, 2010		
Due date (<i>five years after triggering action date</i>): September 24, 2015		

Five-Year Review Summary Form (continued)

Issues/Recommendations				
Issues and Recommendations Identified in the Five-Year Review:				
OU(s): Waste Pits OU	Issue Category: Monitoring			
	Issue: It is not known whether the SCAQMD model that was used to determine allowable emissions from the SVE/IBT system and the cap gas treatment system remains protective since the Waste Pits remedial systems were initially designed in 1998.			
	Recommendation: Review, and possibly update, the allowable emissions standard for carcinogenic air pollutants as it would apply to emissions from the Waste Pits OU.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PRP	EPA	2016
OU(s): Waste Pits OU	Issue Category: Monitoring			
	Issue: The soil gas monitoring program for soil gas on the perimeter does not provide adequate information to assess whether it is a potential problem.			
	Recommendation: Modify perimeter sampling plan to be protective of vapor intrusion.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
No	Yes	PRP	EPA	2016
OU(s): Soil and NAPL OU:	Issue Category: Monitoring			
	Issue: Vapor intrusion methodologies used may not be entirely consistent with current guidance and contaminant concentrations measured in 1995 exceed current Regional Screening Levels for Indoor Air			
	Recommendation: Assess previous vapor intrusion evaluations in light of current guidance, implement a vapor intrusion sampling program where needed.			
Affect Current Protectiveness	Affect Future Protectiveness	Implementing Party	Oversight Party	Milestone Date
Yes	Yes	PRP	EPA	2016
Protectiveness Statement(s)				
<i>Operable Unit:</i> Soil and NAPL		<i>Protectiveness Determination:</i> Protectiveness Deferred		<i>Addendum Due Date</i> 2016

Protectiveness Statement:

A protectiveness determination of the remedy at Soil and NAPL OU cannot be made at this time until further information is obtained. Further information will be obtained by assessing previous vapor intrusion evaluations in light of current guidance and collecting indoor air samples at on-site buildings of concern. It is expected that these actions will take approximately six months to complete, at which time a protectiveness determination will be made.

Operable Unit:
Waste Pits

Protectiveness Determination:
Short-term Protective

***Addendum Due Date
(if applicable): 2016***

Protectiveness Statement:

The remedy at the Waste Pits OU is protective of human health and the environment. The cap is intact and the SVE system is working to prevent site vapors from entering into the groundwater. Institutional controls are in place that prevents exposures to Site contaminants. However, to be protective in the long-term, the SVE/IBT system and the cap gas treatment system emission standard needs to be reviewed and updated, and the sampling plan for the perimeter wells needs to be revised to be protective of vapor intrusion.

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List of Abbreviations

ARARs	Applicable or Relevant and Appropriate Requirements
BECs	building engineering controls
bgs	below ground surface
BRA	Baseline Risk Assessment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CHHSLs	California Human Health Screening Levels
COCs	contaminants of concern
DTSC	California Department of Toxic Substances Control
EAPC	Exposure Area of Potential Concern
EPA	Environmental Protection Agency
ERT	Environmental Review Team
ESD	Explanation of Significant Differences
FYR	Five-Year Review
IBT	in-situ bioventing technology
IRIS	Integrated Risk Information System
ISCO	in-situ chemical oxidation
LADWP	Los Angeles Department of Water and Power
LNAPL	light non-aqueous phase liquid
msl	mean sea level
µg/m ³	microgram per cubic meter
mg/kg	milligram per kilogram
NAPL	non-aqueous phase liquid
NPL	National Priorities List
OM&M	operations, maintenance, and monitoring
OU	Operable Unit
PID	photoionization detector
PME ROF	Performance Monitoring Event Reports of Findings
ppm _v	parts per million by volume
RAOs	Remedial Action Objectives
ROD	Record of Decision
RPM	Remedial Project Manager
RSL	Regional Screening Level
SCAQMD	South Coast Air Quality Management District
SVE	soil vapor extraction
SVOC	semi-volatile organic compound
USACE	U.S. Army Corps of Engineers
VOC	volatile organic compound

Third Five-Year Review Report

for

Del Amo Superfund Site

Operable Unit #1 and #2

1. Introduction

The purpose of a Five-Year Review (FYR) is to evaluate the implementation and performance of a remedy in order to determine if the remedy will continue to be protective of human health and the environment. The methods, findings, and conclusions of FYRs are documented in Five-Year Review reports. In addition, FYR reports identify issues found during the review, if any, and document recommendations to address them.

The U.S. Environmental Protection Agency (EPA) prepares FYRs pursuant to the Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA), Section 121, and the National Contingency Plan. CERCLA 121 states:

If the President selects a remedial action that results in any hazardous substances, pollutants, or contaminants remaining at the site, the President shall review such remedial action no less often than each five years after the initiation of such remedial action to assure that human health and the environment are being protected by the remedial action being implemented. In addition, if upon such review it is the judgment of the President that action is appropriate at such site in accordance with section [104] or [106], the President shall take or require such action. The President shall report to the Congress a list of facilities for which such review is required, the results of all such reviews, and any actions taken as a result of such reviews.

EPA interpreted this requirement further in the National Contingency Plan, 40 Code of Federal Regulations (CFR), Section 300.430(f)(4)(ii), which states:

If a remedial action is selected that results in hazardous substances, pollutants, or contaminants remaining at the site above levels that allow for unlimited use and unrestricted exposure, the lead agency shall review such actions no less often than every five years after the initiation of the selected remedial action.

The U.S. Army Corps of Engineers (USACE) conducted the FYR under contract to EPA, and drafted this report regarding the remedy implemented at the Del Amo Superfund Site (Site) in the city of Los Angeles, Los Angeles County, California. EPA is the lead agency for developing and implementing the

remedy for the Site. EPA finalized and signed this FYR report. The California Department of Toxic Substances Control (DTSC), as the support agency representing the State of California, has reviewed all supporting documentation and provided input to EPA during the FYR process.

The Site consists of three Operable Units (OUs).

- Soil and NAPL (OU-1) – This OU includes contaminated soil outside of the waste pits area, including chemicals in non-aqueous phase liquid (NAPL) form. The remedy for this OU has not yet been implemented.
- Waste Pits (OU-2) – This OU includes wastes deposited in the waste pits and surrounding impacted soils. The remedy for this OU is currently operating.
- Dual-Site Groundwater (OU-3) – This OU includes groundwater contaminated by the Del Amo Site co-mingled with groundwater contamination from the nearby Montrose Superfund Site and other neighboring facilities. The remedy for this OU is not yet operating.

This FYR addresses the Soil and NAPL OU (OU-1) and the Waste Pits OU (OU-2) at the Del Amo Superfund Site. A separate FYR report is being prepared to address the Dual-Site Groundwater OU (OU-3) and will be completed concurrently with this FYR.

This is the first FYR for OU-1 and the third FYR for OU-2. The triggering action for this statutory review is the previous FYR. The FYR is required due to the fact that hazardous substances, pollutants, or contaminants remain at the site above levels that allow for unlimited use and unrestricted exposure.

2. Site Chronology

The following table lists the dates of important events for Del Amo Superfund Site OU-1 and OU-2.

Table 2-1. Chronology of Site Events

Event	Date
Operation of styrene and butadiene plants commenced at Del Amo.	1943
Operation of synthetic rubber plant commenced at Del Amo.	1944
Styrene, butadiene, and synthetic rubber plants gradually shut down.	1969 to 1972
First environmental investigations performed under the direction of Department of Health Services to characterize soil and waste materials at the former waste pits.	1981
Waste material and contaminated soil at Waste Pit 1A excavated in four phases and disposed off-site. Void subsequently backfilled.	1982 to 1984
Initial characterization data documented in <i>Draft Del Amo Site Investigation Phase 1 Report</i> , <i>Interim Summary of Findings</i> , <i>Del Amo Site Investigation</i> , and <i>Summary of Soil Data at the Western Waste Industries Del Amo Site, Lot 37</i> .	1984
EPA proposed that Del Amo be added to the National Priorities List (NPL) and divided the Site into three operable units.	1991
Baseline risk assessment for Waste Pits OU performed.	1991

Event	Date
EPA, DTSC, Shell Oil Company, and Dow Chemical Company entered into an Administrative Order on Consent to perform a remedial investigation/feasibility study.	1992
<i>Phase I Remedial Investigation Report, Del Amo Study Area</i> submitted.	1993
Indoor/outdoor air monitoring performed at the Waste Pits OU and adjacent residences.	1994
<i>Final Focused Feasibility Study, Del Amo Waste Pits Area</i> submitted and approved by EPA.	1996
<i>Record of Decision (ROD)</i> for the Waste Pits OU issued.	1997
<i>Pre-final Design Report</i> submitted and approved by EPA.	1999
<i>Operations, Monitoring, and Maintenance Manual for the Del Amo Waste Pits Operable Unit (OM&M Manual)</i> submitted.	1999
Most components of the Waste Pits OU remedy (cap, SVE wells, cap gas collection and treatment system, drainage channels, and fence) installed and deed restriction (restrictive covenant) ³ recorded for one of two parcels that compose Waste Pits OU.	1999-2000
The Site is placed on the NPL.	2002
<i>Explanation of Significant Differences (ESD)</i> issued for the Waste Pits OU. The ESD specified the Applicable or Relevant and Appropriate Requirements (ARARs) that apply to the use of adsorption treatment technology.	2002
<i>Remedial Design Work Plan Addendum for SVE</i> submitted and approved by EPA. Work plan proposes combination of SVE and bioventing for treatment of contaminated soil vapor at Waste Pits OU. Field design tests for in-situ bioventing technology (IBT) performed.	2005
Deed restriction recorded for second of two parcels that compose Waste Pits OU.	2005
First Five-Year Review Report completed.	2005
SVE/IBT Operations, Maintenance and Monitoring Manual submitted and approved by EPA.	2006
SVE/IBT system placed into full-time operation.	2006
ESD #2 for the Waste Pits OU issued. ESD #2 provided information regarding the length of time that the SVE system will need to operate before soil clean-up goals are achieved.	2006
Baseline Risk Assessment Report for the Soil and NAPL OU completed.	2006
Remedial Investigation Report for the Soil and NAPL OU completed.	2007
Waste Pits Operation, Maintenance and Monitoring Manual submitted (approved by EPA in 2011).	2008
Final Soil and NAPL OU Feasibility Study completed.	2010
Second Five-Year Review report completed.	2010
ROD for the Soil and NAPL OU issued.	2011

³ A “deed restriction” is synonymous with “restrictive covenant.” In the Waste Pits OU2 ROD, the term “deed restriction” is used. In the Soil & NAPL OU1 ROD, the term “restrictive covenant” is used. In this 5-Year Review report, discussions regarding the Waste Pits OU2 use the term “deed restriction,” and discussions regarding the Soil & NAPL OU1 use the term “restrictive covenant.”

3. Background

3.1. Physical Characteristics

3.1.1. Site Description

The Del Amo Superfund Site is located within the city of Los Angeles, California, in an area of the city referred to as the Harbor Gateway (Figure 3-1). Approximately 10 miles north of the Pacific Ocean, it is bordered in the west by the city of Torrance and in the east by the city of Carson. The Site is bounded by 190th Street to the north, Hamilton Avenue to the east, Del Amo Boulevard to the south, and railroad tracks (prior to reaching Normandie Avenue) to the west. A residential neighborhood is located south of the Site, with commercial and industrial buildings along the remaining sides.

3.1.2. Surface Features

The Site lies in the Torrance Plain, a relatively flat area within the broad coastal plain of the greater Los Angeles area. The closest surface water body is the Dominguez Channel, a manmade concrete drainage channel approximately 2,000 feet northeast of the former plant site. Surface water runoff is controlled by the local streets and storm drain system. The elevation ranges from 48 feet mean sea level (msl) on the western edge of the former plant site to approximately 30 feet msl on the eastern edge.

3.1.3. Geology

The subsurface in the vicinity of the Site consists of stratified, heterogeneous alluvial deposits that extend hundreds of feet below the ground surface (bgs) and include sands, silts, clays, and shell beds. Units designated in these deposits include the Upper Bellflower Aquitard, the Middle Bellflower Sand, the Lower Bellflower Aquitard, and the Gage Aquifer. In the western portion of the Site, the Middle Bellflower Sand is separated by a mud layer into two sub-units, Middle Bellflower B Sand and the Middle Bellflower C Sand. This mud layer, the Middle Bellflower Mud, is of variable thickness, thinning rapidly to the east, and not present in the central and eastern portions of the Site.

A summary of the formations at the Site is found in Table 3-1 and Figure 3-2.

Table 3-1. Formations Observed at the Site

Formation and Depth (feet bgs)	Groundwater Flow Direction	Notes
Upper Bellflower Aquitard (0-80)	Southwest, but highly variable with mounding near waste pits and southeast corner of Site.	Comprised of mud with sandy zones, discontinuous sands. Low permeability.
Middle Bellflower B Sand (80-100)	South to southeast in vicinity of Site.	Stratified sands, shell beds, mud, and continuous sand.
Middle Bellflower Mud (Variable)	No data	Mud layer that thins rapidly to the east, and not identifiable in central and eastern parts of Site.
Middle Bellflower C Sand (100-140)	South to south/southeast at the Site.	Stratified sands, shell beds, mud, and continuous sand.

Lower Bellflower Aquitard (140-170)	No data	Mud with sandy zones. Low permeability.
Gage Aquifer (170-240)	Southeast	Stratified sands, shell beds, mud zones.

Source: Dames & Moore 1993; URS 2012

3.1.4. Hydrology

In 2014, water table elevations at the Site ranged from -8.56 msl to -10.57 feet msl, depending upon location. The water table is located in the Upper Bellflower Aquitard across the majority of the Site, although it intersects the Middle Bellflower B Sand at the western margin of the Site. Groundwater flow direction in the water table zone is generally toward the south-southwest, but a radial flow pattern associated with local groundwater mounding is inferred in the vicinity of the waste pits area and near the southeast corner of the Site. In lower hydrostratigraphic units, flow is to the south or southeast (Table 3-1). The greatest groundwater flow takes place in the Middle Bellflower Sand (B and C) and in the Gage Aquifer, due to higher hydraulic conductivities.

The water table in the vicinity of the Site has been rising steadily since the late 1970s due to recharge and decreased groundwater extraction, with more than 20 feet of rise observed across the Site. Rates of water table rise were initially on the order of 1 foot per year, but these have leveled in recent years, with approximately 1.5 feet of rise observed between 2006 and 2014. The rising groundwater levels have dispersed the light nonaqueous phase liquid (LNAPL) through the upper saturated zone and introduced dissolved phase contaminants into newly saturated soils.

Water table elevations observed in co-located wells, screened at different depths, indicate that a vertical hydraulic gradient is also observed at the Site. At a given location, groundwater elevations in wells screened in the Upper Bellflower Aquitard, Middle Bellflower B Sand, and Middle Bellflower C Sand are within a few feet of each other and decrease with depth, and the groundwater elevations in the Gage Aquifer are typically an additional 2-4 feet lower than those observed in the Middle Bellflower C Sand. The decreasing water level with depth indicates a downward hydraulic gradient.

3.2. Land and Resource Use

The Site comprises approximately 280 acres, and has been redeveloped into a commercial/industrial business park. All surface facilities associated with the former plant have long been dismantled and removed, although some concrete foundations or other remnants of previous structures have been encountered in the subsurface during the environmental investigations and redevelopment activities. The Site was subdivided into 83 separate parcels. Buildings, paved parking areas, streets, and landscaped areas currently cover more than 90 percent of the Site. The remaining undeveloped areas consist of Los Angeles Department of Water and Power (LADWP) parcels used for high-voltage power transmission lines (one is paved, one is not), the former waste pits area (unpaved but covered with a multilayer cap), and an adjacent unpaved property used for bin and dumpster storage.

Currently, 68 buildings and five surface streets occupy the Site, with building footprints ranging up to 215,000 square feet. The zoning for most of the parcels is for heavy or light manufacturing/industrial, and

one parcel (containing a hotel) has a dual industrial/commercial zoning designation. The buildings are used primarily for warehouse/freight operations, manufacturing, and office space. The two parcels containing the LADWP power lines are zoned as “public facilities.” All current structures at the Site are limited to business use, and there are no known residents.

The area surrounding the Site is zoned for manufacturing/industry to the north, east, and west. A residential area is present approximately 650 feet north of the Site, across the 405 Freeway. Residential and industrial zoned areas border the Site to the south. It is not expected that the current zoning will change in the future, with the exception of an approximately three-block portion of the residential area immediately south of the waste pits area. This area was razed and future zoning is unknown.

The State of California designates all of the groundwater under the Site as municipal supply beneficial use; that is, as being a potential source of drinking water. Currently, no known municipal water supply or production wells exist within the area of contaminated groundwater under the Site. The nearest municipal supply wells are about 1 to 1.5 miles downgradient of the site. (Montrose Chemical, 1997).

3.3. History of Contamination

The Del Amo synthetic rubber plant consisted of three separate plants dedicated to the manufacture of styrene, butadiene, and synthetic rubber. Synthetic rubber was produced by manufacturing styrene and butadiene separately, piping them to the rubber plant, and then mixing the two together. The plants operated from approximately 1943 to 1972. Chemicals used in the production of styrene include propane, crude benzene, toluene, ethylbenzene, a caustic, hydrochloric acid, and sulfuric acid, among others. Chemicals used in the production of butadiene include butane and butylenes, among others.

During operations, some of the waste generated was disposed at the waste pits located at the southern edge of the area. The waste pits consisted of three unlined evaporation ponds (Waste Pits 1A, 1B, and 1C; Figure 3-3) and six unlined waste pits (referred to as Waste Pits 2A through 2F; Figure 3-3). The 1-series waste pits received aqueous waste, and the 2-series waste pits received semi-viscous to viscous wastes. Materials disposed of at the 1-series waste pits included acid sludge, kaolin clay, lime slurry, and petroleum hydrocarbons. The 2-series waste pits received an aluminum chloride complex containing petroleum hydrocarbons. The 2-series waste pits also received heavy impurities and tars, including sulfur tars from the styrene purification process. The 1-series waste pits were larger in extent compared to 2-series waste pits. However, the 2-series waste pits were considerably deeper, ranging from 17 to 22 feet in depth, compared to the 1-series waste pits, which were approximately 6 feet deep.

In addition to the waste pits, releases of hazardous substances into the environment occurred to varying degrees within the remainder of the Site (OU1). Figure 3-4 shows significant release areas within the remainder of OU1.

The California Department of Health Services, precursor to DTSC, started investigating the waste disposal areas at Del Amo in 1983, wherein contamination was discovered in the waste pits and underlying soils. Further investigation found contaminants in the soil were entering groundwater and exceeding Maximum Contaminant Levels. This groundwater fed into an aquifer used for municipal

drinking water. EPA determined that exceedance of Maximum Contaminant Levels by groundwater warranted remedial action to prevent additional migration of the chemicals into drinking water. In July 1991, EPA proposed the Del Amo Site be listed on the National Priority List (NPL). In 2002, the site was placed on the NPL.

3.4. Initial Response

3.4.1. Waste Pits Operable Unit

Prior to issuance of the Waste Pits OU Record of Decision (ROD) in 1997, the following actions were conducted at the Site:

- Under State oversight, from 1982 to 1984, waste material and soil from Waste Pit 1A was removed at depths ranging between 6 to 25 feet bgs. Approximately 8,000 cubic yards of waste and 12,000 cubic yards of contaminated soil were disposed off-site at an appropriate hazardous waste facility. Following regulatory approval, the excavation was then backfilled in 1985. However, based on samples collected from the base of the excavation, contaminated soil likely remained.
- In July 1994, EPA issued a Unilateral Administrative Order to the Shell Oil Company following discovery of small areas of exposed waste at Waste Pits 2A and 2B. Under the order, Shell was required to secure the waste pits, perform routine inspections of the Waste Pits OU, and address seeps of waste material from the waste pits. This Order was carried out until September 1999, at which time EPA issued a Notice of Completion.

3.4.2. Soil and NAPL Operable Unit

Prior to the issuance of the Soil and NAPL ROD in 2011, numerous response actions occurred related to redevelopment of the Site. Table 3-2 below lists these response actions (EPA 2011).

Table 3-2. Summary of Development-Related Actions

APN	Year	Project Description	Characterization	Action Completed
7351-031-031	1997-2000	Construction of new building on previously vacant parcel	Test pits and soil sampling by owner; analyses for total petroleum hydrocarbons (TPH), VOCs, semivolatile organic compounds (SVOCs), metals, polychlorinated biphenyl (PCBs)	Excavation, transportation and disposal of VOC and PCB-impacted soil by owner prior to regrading of property and construction of new building

Table 3-2. Summary of Development-Related Actions

APN	Year	Project Description	Characterization	Action Completed
7351-034-069	2005-06	Excavation/Construction of loading dock	Soil sampling by Respondents; analyses for VOCs, mercaptans.	Excavation, transportation, and disposal of odiferous soil by Respondents. Analytical testing did not indicate elevated levels of any VOCs or mercaptans. Excavation backfilled with clean soil prior to continuation of construction.
7351-034-058	2005-06	Expansion of existing building and excavation/ construction of loading dock	Soil sampling by owners and Respondents; analyses for VOCs	Excavation, transportation and disposal of odiferous and VOC-impacted soil by Respondents; backfill with clean soil prior to construction
7351-033-017	2008	Construction/installation of freight elevator and utility trenches	Soil and soil vapor sampling by Respondents; analyses for TPH, VOCs, SVOCs, and metals	None; soil not impacted.
7351-031-027, -028, -029	2010	Installation of subsurface communication cable	Trench excavation completed by tenant (Herbal Life); soil testing by Respondents; analysis for TPH and VOCs	Soil not impacted but transportation and disposal by Respondents
7351-034-052	2010	Tenant (Toyota) removed hydraulic lifts upon end of lease	Soil sampling by tenant and owner; analyses for TPH and VOCs	Excavation of TPH-impacted soil by tenant; transportation and disposal by Respondents
7351-031-030	2012	Demolition of 2 existing buildings and construction of new building	Excavation completed by owner; soil sampling by Respondents; analysis for TPH, VOCs, SVOCs/PAHs, pesticides and metals	Excavation transportation and disposal of TPH, VOC and metal-impacted soil by Respondents
7351-034-074	2013	Expansion of existing building	Excavation completed by owner; soil sampling by Respondents; analysis for TPH, VOCs and metals	Excavation, transportation and disposal of TPH and VOC-impacted soil by Respondents

3.5. Basis for Taking Action

The primary threat to human health for the Waste Pits OU was posed by exposure to contaminated soils from: (1) direct human contact, (2) uncontrolled runoff and wind-blown dust, (3) emissions of contaminants into the air, and (4) the ingestion of municipal water from the contaminated aquifer. The primary contaminants of concern (COCs) for the Waste Pits OU were volatile organic compounds (VOCs) and semi-volatile organic compounds (SVOCs), primarily benzene and naphthalene.

For the Soils and NAPL OU, the principal threats to human health are by exposure to contamination in the shallow soils, and to the groundwater by contaminated deep soil and NAPL. The primary COCs for the Soils and NAPL OU are VOCs, SVOCs, and metals. Primary VOCs include benzene, tetrachloroethene, and trichloroethene. Primary SVOCs include various polycyclic aromatic hydrocarbons. Primary metals include arsenic, cadmium, and manganese.

The presence of these contaminants in waste material and adjacent soils, shallow and deep soils, soil gas, and NAPL provided the basis for taking action under CERCLA.

4. Remedial Actions

4.1. *Remedy Selection*

4.1.1. Waste Pits Operable Unit

On September 5, 1997, the ROD for the Waste Pits OU was signed. The remedy selected included the following components, which have all been implemented (as will be described in Section 4.2).

- A Resource Conservation and Recovery Act equivalent cap
- Soil vapor monitoring
- Surface water controls
- Soil vapor extraction (SVE)
- Security fencing
- Deed restrictions
- Long-term operation and maintenance

Remedial Action Objectives

The 1997 ROD provides Remedial Action Objectives (RAOs) for the main components of the remedy - the cap and the SVE system.

Cap RAOs are:

- To prevent direct human contact with contaminants
- To prevent generation of uncontrolled runoff and windblown dust
- To prevent emission of contaminants into the air
- To prevent rainwater from washing through the waste pits and carrying contaminants into the groundwater
- To prevent rainwater from washing through the contaminated vadose zone soils below the pits and carrying them into the groundwater

SVE system RAOs are:

- To protect groundwater from contaminants that migrate out of the pits
- To protect groundwater from contaminants that migrate out of the vadose soil below the pits
- To protect groundwater from contaminants in the soil below the pits in the event that the water table rises into the contaminated soil

Performance Standards

The performance standard for the SVE system is that the pits will not be able to cause an incremental groundwater contribution in excess of 0.5 percent of the existing groundwater concentration, at any point in time. The ROD defined methods for calculating the performance standard. The calculations were initially performed during the Remedial Design in 1999 and updated in 2012.

Table 4-1 shows SVE Performance Standards for the four sub-areas of the Waste Pits Area.

Table 4-1. SVE Performance Standards (soil gas concentrations)

	Sub-Area 1 ¹		Sub-Area 2 ²		Sub-Area 3 ³		Sub-Area 4 ⁴	
	Initial ⁵	Current ⁶	Initial	Current	Initial	Current	Initial	Current
Contingency standards (ppm _v) ⁷	4,300	7,300	17,000	12,100	7,200	3,500	700	60
Remediation goals (ppm _v)	510	870	2,000	1,430	840	420	78	7

¹ Sub-Area 1 includes Waste Pits 2E and 2F;

² Sub-Area 2 includes Waste Pits 2A through 2D;

³ Sub-Area 3 includes Waste Pits 1B and 1C;

⁴ Sub-Area 4 includes Waste Pits 1A.

⁵ Initial: Baseline calculations presented in the OM&M manual;

⁶ Current: calculation using 2011-2012 data from eleven existing wells

⁷ ppm_v: parts per million volume

On August 13, 2002, an Explanation of Significant Differences (ESD) was signed. This ESD adds ARARs for a new adsorption technology to treat extracted vapors from the SVE system. The technology had not been identified by the ROD. The adsorption technology would utilize on-site regeneration and, where viable, reuse the recovered chemicals from the adsorption process as recycled products in industrial processes.

On August 24, 2006, a second ESD was signed. This ESD describes the use of an in-situ bioremediation (bioventing) component of the SVE treatment system, and estimates that this new system will require operation for approximately 10 to 15 years before cleanup goals are attained. The bioventing component was designed to re-oxygenate and re-inject 75 percent of the extracted vapors back into the subsurface, in order to use the in-situ bioremediation process to destroy site contaminants. The remaining 25 percent of the extracted vapors would be treated above-ground with a carbon filter before the airstream is released to the atmosphere.

4.1.2. Soil and NAPL Operable Unit

On September 30, 2011, the ROD for the Soil and NAPL OU was signed. The selected remedy addresses seven shallow vadose zone areas (three contaminated with VOCs and four with non-VOCs), four deep vadose zone areas contaminated with VOCs, and three areas in the submerged zone contaminated with VOC NAPL. The selected remedy includes the following components:

- Institutional controls to include informational outreach, building permit review, General Plan footnote, and restrictive covenants
- Capping for impacted shallow outdoor soils in Property Areas 2, 16, 28, and 35
- Building engineering controls (BECs) for VOC-impacted shallow soil under the building in Property Area 16
- SVE for VOC-impacted shallow outdoor soil in Property Areas 6, 11, and 23
- SVE for VOC-impacted shallow soil under the building in Property Area 23
- SVE for vadose soil in NAPL-impacted Source Area 6
- In-situ chemical oxidation (ISCO)⁴ and SVE for deep soil and groundwater in NAPL-impacted groundwater contamination Source Areas 3, 11, and 12
- For future areas of contamination encountered during redevelopment and construction
 - Excavation, or
 - BECs, capping, or SVE and
 - Restrictive covenants

The remedial action areas mentioned in the remedy components are shown in Figure 4-1. The remedy component description and cleanup goals are presented in the paragraphs below.

Remedial Action Objectives

The RAOs stated in the Soil and NAPL OU ROD are:

- Prevent human exposure through direct contact, ingestion, or inhalation of outdoor shallow soil contaminated above levels for commercial land use or construction activities
- Prevent inhalation of VOCs in indoor air above levels for commercial land use
- Prevent utilization of impacted groundwater and groundwater in adjacent areas
- Protect groundwater outside the impacted areas by removing NAPL to limit migration to, or contact with, groundwater

Remedy Components

Institutional Controls

⁴ ISCO is a remedial technology that oxidizes (chemically breaks down) VOC contaminants, converting them into non-toxic by-products, such as carbon dioxide and water.

Institutional controls to include information outreach, building permit review, General Plan footnote, and restrictive covenants. These are discussed in more detail in Section 6.7.2.

Capping for VOC and non-VOC-impacted shallow outdoor soil

Capping will be implemented in the four areas mentioned above and shown on Figure 4-1, where non-VOCs, and in some cases VOCs, are present above the action level. The cleanup goal for capping is to prevent direct contact with impacted soils and prevent migration of dust from these areas. Caps currently exist at each of the four areas in the form of asphalt or concrete covered streets, parking lots, or storage areas. The remedial design⁵ will evaluate whether these existing caps are sufficient to meet the cleanup goal.

Building Engineering Controls for VOC-Impacted Shallow Soil under a Building

BECs will be applied at the building on property 16 if VOC vapors from subsurface contamination accumulate within the building in excess of the action levels. Both indoor air and outdoor background concentrations of COCs will be sampled and evaluated to determine whether action levels are clearly exceeded. If action levels are clearly exceeded, the exact controls will be determined during remedial design, but the ROD requires that the following controls be implemented as appropriate:

- Existing or enhanced ventilation measures
- Building pressurizing
- Floor sealing
- Sub-slab venting

The goal of the BEC is to prevent unacceptable exposures of Site-related contaminants to building occupants by reducing indoor air concentrations of target VOCs to commercial indoor air EPA Regional Screening Level (RSL), California Human Health Screening Level (CHHSL) criteria, or background, whichever is higher. Sampling data will be used to make this determination. Table 4-2 presents the RSLs and CHHSLs for known COCs.

Table 4-2. RSL and CHHSL Levels for BECs

Chemical	CHHSL¹ (µg/m³)	RSL² (µg/m³)
Benzene	0.14	1.6
Chloroform	None	0.53
Tetrachloroethene	0.69	2.1
Trichloroethene	2.04	6.1

⁵ Remedial design is the phase in the CERCLA process where the remedy components are designed for construction or implementation.

¹ CHHSL – California Human Health Screening Level

² RSL – EPA Regional Screening Level

Cleanup levels will be either the commercial indoor air CHHSL, commercial RSL, or background, whichever is higher.

SVE for VOC-Impacted Outdoor Shallow Soil

SVE will be implemented to remove VOCs from the shallow soil at properties 6, 11, and 23. The cleanup goal for the outdoor shallow soil away from (not adjacent to) the buildings is a VOC concentration for each constituent that does not exceed non-cancer hazard index of 1.0 and excess cancer risk of 1×10^{-6} when exposed to receptors outdoors in a commercial-use setting. Table 4-3 presents the cleanup goals for SVE in outdoor shallow soil (these are also the outdoor soil RSLs.)

Table 4-3. Cleanup Goals for Outdoor Soil

Chemical	Concentration (mg/kg)
Benzene	5.4
Chloroform	1.5
Tetrachloroethene	2.6
Trichloroethene	6.4

SVE for VOC-Impacted Soil under a Building

SVE will be implemented for soil beneath one building on property number 23. The cleanup goal for the shallow soil beneath and adjacent to the building is a VOC concentration for each contaminant that does not exceed a non-cancer hazard index of 1.0 and an excess cancer risk of 10^{-6} when exposed to receptors inside the building in a commercial-use setting. The cleanup goals for this component are based on the indoor air RSL or the concentration in background air, whichever is higher, divided by site-specific attenuation factors to obtain sub-slab contaminant concentration and soil gas contaminant concentration in soil outside but adjacent to building. Table 4-4 presents the indoor air RSLs used to determine the cleanup levels.

Table 4-4. Potential Basis for Indoor Air Cleanup Goals

Chemical	Indoor Air RSLs ($\mu\text{g}/\text{m}^3$)
Benzene	1.6
Chloroform	0.53
Tetrachloroethene	2.1
Trichloroethene	3.0

RSL – EPA Regional Screening Level

Cleanup goals will be based on the higher of background air or the indoor air RSL.

SVE for Vadose Zone Soil in a NAPL-Impacted Groundwater Contamination Source Area

SVE will be used to remove VOCs from the NAPL-impacted vadose zone soil in Source Areas 3, 6, 11 and 12. Additional sampling will be performed during remedial design to determine the exact areal and vertical extent of the NAPL-impacted soil requiring remediation. The cleanup goal will be two-fold. First, the SVE system must ensure that any VOCs mobilized by the ISCO treatment system in the underlying saturated zone are captured by the SVE system. Second, the VOCs in the deep vadose zone soil must be removed to the extent practicable with the SVE technology. The purpose of the contaminant mass reduction is to enhance the groundwater remedy rather than to achieve a quantifiable reduction in risk. The cleanup goal will be met when EPA determines that each of the following conditions has been documented through monitoring data:

- SVE has been conducted, with significant reductions in soil gas VOC concentrations
- Asymptotic conditions have been reached
- VOC concentrations do not significantly increase when treatment is stopped (no meaningful rebound is occurring), beyond the zone affected by off-gassing from the water table

ISCO and SVE for Deep Soil and Groundwater in NAPL-Impacted Groundwater Contamination Source Areas

ISCO and SVE will be applied in combination to remove VOC contaminants in Source Areas 3, 11 and 12; ISCO will be applied in the saturated zone, and SVE will be applied in the vadose zone. The cleanup goal is to remove as much NAPL mass as practicable with the ISCO technology. This remedy will have reached the cleanup goal when EPA, in consultation with DTSC, determines that the remediation has reached a point of diminishing returns (i.e., additional applications of oxidant result in little to no further decreases in dissolved VOC concentrations and production of oxidation by-products.) The following defines the conditions of diminishing returns:

- ISCO has been conducted, with resultant reductions in dissolved concentrations
- Asymptotic conditions have been reached
- VOC concentrations do not significantly increase when treatment is stopped

4.2. *Remedy Implementation*

4.2.1. Waste Pit Operable Unit

The remedy for the Waste Pit OU was implemented in phases. Phase I included construction of the cap, installation of soil vapor monitoring probes, soil vapor extraction wells, a cap gas system, security fences, and surface and subsurface drainage features, and implementation of the deed restrictions. Installation of the physical Phase I components was completed in 1999, and implementation of the deed restrictions was completed in 2005. The cap system and SVE system are monitored for compliance with the RAOs and performance standards described in Section 4.1.1.

Phase II was implemented in 2006 and included the design and construction of the SVE/in-situ bioventing technology (IBT) system. The SVE/IBT system included existing SVE wells consisting of 4 injection wells and 9 extraction wells. Phase I SVE wells in sub-area 3 and 4, with the exception of SVE well 20A in sub-area 3, were not used, and thus no longer monitored, because vapor concentrations were below remedial goals.

Phase III includes the evaluation of the Phase II SVE/IBT system performance and system modifications. Phase III was implemented in 2014 and included destruction of SVE extraction and injection wells and installation of new ones in order to optimize system performance. Rising groundwater had covered some of the SVE wells and affected performance, leading to the need for these changes.

The multilayer cap present at the Waste Pits OU is covered with vegetation consisting of California native shallow-rooted grasses. Surface drainage channels are located on the north and south sides of the cap to collect and divert rainfall from the cap. Surface water flows down the channels to catch basins located near the eastern side of the cap, and then to the municipal storm sewer. No surface water flows into the waste pits area. Additionally, various SVE/IBT conveyance piping and a system treatment pad are located just north of Waste Pit 2A. Deed restrictions are in place for the Waste Pits OU, prohibiting inappropriate future land use or development.

For the Waste Pits OU, operations and maintenance consists of monitoring the SVE/IBT system and cap gas treatment system. Monitoring is performed in accordance with the Waste Pits Operation, Maintenance, and Monitoring (OM&M) Manual (C2REM, 2011b). The OMM Manual was updated in 2011. An annual report presents data from the year's monitoring. As noted previously, the SVE/IBT system was upgraded during this FYR period to address the rising groundwater levels.

4.2.2. Soil and NAPL Operable Unit

The remedy has not yet been implemented for this OU. However, in 2008, EPA implemented an Institutional Controls Pilot Program in cooperation with DTSC, the City of Los Angeles Department of Building and Safety and the City of Los Angeles Department of City Planning. In the building permit review discussion in the ROD, the pilot program is selected as a component of the final remedy. This is discussed in more detail in Section 6.7.2.

5. Progress since the Last Five-Year Review

5.1. Previous Five-Year Review Protectiveness Statement and Issues

This is the first FYR for the Soil and NAPL OU.

The protectiveness statement from the 2010 FYR for the Del Amo Waste Pit OU stated the following:

The Del Amo Waste Pits' Resource Conservation and Recovery Act -equivalent cap and drainage controls, SVE/IBT system, and the deed restrictions are protective of human health and the environment; exposure pathways that could result in unacceptable risks are being controlled. The components of the selected remedy have performed and are currently performing at a level consistent with design parameters. The remedy is effectively preventing direct human contact with contaminants and preventing contaminant migration from the vadose zone to the groundwater.

The 2010 FYR included no issues or recommendations that affected the protectiveness of the remedy.

5.2. Work Completed at the Site during this Five-Year Review Period

5.2.1. Waste Pits Operable Unit

Performance of the SVE/IBT system was evaluated and design modifications were implemented because rising water table elevation made certain wells ineffective. Modifications included the following activities:

- Proper destruction of existing SVE wells
- Installing new SVE wells and piping
- Resealing small portions of waste pit cap liner where the old wells were removed and new wells installed

5.2.2. Soil and NAPL Operable Unit

The ROD was signed during this period for the Soil and NAPL OU. No additional work has been performed during this FYR period except for ongoing activities associated with the permit review institutional control, discussed in Section 6.7.2.

6. Five-Year Review Process

6.1. Administrative Components

EPA Region 9 initiated the FYR in October 2014 and scheduled its completion for September 2015. The review team was led by Dante Rodriguez of EPA, Remedial Project Manager (RPM) for the Del Amo

Superfund Site. Team members from USACE supported the review including Marlowe Laubach, Zach Wilson, Jon Moen, Thad Fukeshige, and Chay Tang. On October 1, 2014, EPA held a scoping call with the review team to discuss the Site and items of interest as they related to the protectiveness of the remedy currently in place.

6.2. *Community Involvement*

EPA hosted a community outreach event on June 19-20, 2015 to provide the community an opportunity to provide their comments, views, and concerns about the site. The information provided is included in the FYR in Appendix D.

The FYR report will be made available to the public once it has been finalized. Copies of this document will be placed in the following designated information repositories and on the Del Amo Superfund Site website (www.epa.gov/region09/delamo).

Carson Public Library
151 East Carson Street
Carson, CA 90745
(310) 830-0901

Torrance Civic Center Library
3301 Torrance Boulevard
Torrance, CA 90503
(310) 618-5959

Superfund Records Center
Mail Stop SFD-7C
75 Hawthorne St., Room 3110
San Francisco, CA 94105
(415) 947-8717

6.3. *Document Review*

This FYR included a review of relevant Site-related documents, including the ROD, remedial action reports, and recent monitoring data. A complete list of the documents reviewed can be found in Appendix A.

6.3.1. **Applicable or Relevant and Appropriate Requirements Review**

Section 121 (d)(2)(A) of CERCLA specifies that Superfund remedial actions must meet any Federal standards, requirements, criteria, or limitations that are determined to be legal ARARs. Applicable or Relevant and Appropriate Requirements are those standards, criteria, or limitations promulgated under federal or state law that specifically address a hazardous substance, pollutant, contaminant, remedial action, location, or other circumstance at a CERCLA site.

The Waste Pits OU ROD and subsequent ESDs did not have any chemical-specific ARARs. The Soil and NAPL OU chemical-specific ARARs were related to hazardous waste disposal codes, National Pollutant Discharge Elimination System, and air permit requirements. Appendix C provides an analysis of ARARs for both the Waste Pits OU and the Soil and NAPL OU.

There have been no revisions to laws and regulations that affect the protectiveness of the remedy.

6.3.2. Human Health Risk Assessment Review

Two risk assessments were completed for the Del Amo Superfund Site -- a 1991 baseline human health risk assessment completed for the Waste Pits OU and a 2006 baseline risk assessment (BRA) for the Soil and NAPL OU. These risk assessments were reviewed to identify any changes in exposure or toxicity that would impact protectiveness.

Waste Pits Operable Unit

The risk assessment identified the exposure pathways and receptors at the Del Amo Waste Pits OU as the inhalation of surface chemical vapors by residents located on the south side of the fence line, office workers located on the northern fence line, and maintenance workers on the Site. The risk assessment did not evaluate potential future exposures that might occur if conditions at the waste pits area were to change (e.g., if soil fill cover over the wastes were allowed to erode.) Also, the risk assessment did not quantitatively evaluate risks associated with contaminated groundwater. Risks associated with the contaminated groundwater are addressed separately under the Dual-Site Groundwater OU.

The exposures presented in the 1991 human health risk assessment have been mitigated by the implementation of a cap over the Waste Pit Area. The cap's gas collection and treatment system has been implemented to continuously remove contaminants from Site soils that otherwise could have volatilized into the air.

Soil and NAPL Operable Unit

The BRA evaluated potential health risks associated with chemicals within the Soil and NAPL OU to current commercial workers, current construction workers (called "trench workers"), and hypothetical future residents at the Del Amo Site. Primary routes of potential human exposure included incidental ingestion, dermal contact, inhalation of fugitive dust, and inhalation of vapors in indoor and outdoor air. The Site was divided into exposure areas where a receptor could be exposed to Site-related contaminants based on parcels. The health risks were then evaluated for each parcel area. A total of 37 exposure areas of potential concern (EAPCs) were identified. Of these EAPCs, ten were determined by EPA to warrant remedial action. Only one EAPC had greater than 10^{-4} risk for the current commercial/industrial land use (based on dermal and ingestion exposure to outdoor soil). Nine other EAPCs exceeded 10^{-6} and/or 10^{-5} risk for commercial/industrial land use (based on various exposure routes). Twenty six EAPCs had greater than the 10^{-4} risk and/or had a Hazard Index greater than 1 for the future hypothetical resident. The exposures and receptors were described in the BRA with some revisions in the Feasibility Study.

Vapor Intrusion

In the Soil and NAPL OU remedial investigation in the mid-1990s, indoor air sampling was performed at thirteen site buildings that overlie or are within 25 feet of a known or suspected VOC source. The sampling program included collecting samples at multiple locations within the buildings and at different seasons. In addition to the indoor air sampling, outdoor air samples were collected during each sampling event near each building to establish the ambient air conditions. At the time, the results were compared to

the Occupational Safety and Health Administration's permissible exposure limits to determine if there was immediate health risk. All results were below this threshold.

However, three compounds were detected at levels that would be above today's EPA's Indoor Air RSLs: benzene, ethlybenzene, and TCE. In addition, there were low-level detections of many COCs. The most commonly detected compound was benzene, which currently has an RSL for commercial buildings of 1.6 $\mu\text{g}/\text{m}^3$. The highest detected concentration in the mid-1990's was 38 ppbv, which converts to concentration of 121 $\mu\text{g}/\text{m}^3$, and ambient air concentrations ranged from 0.65 ppbv to 4.4 ppbv (approximately 2 to 14 $\mu\text{g}/\text{m}^3$). Ethlybenzene was also frequently detected. TCE was less frequently detected. Maximum concentrations for the three compounds are below.

Table 6-1. Vapor Intrusion Screening

	Maximum Concentration Detected (mid-1990's)	2015 Regional Screening Level - Commercial	California Modified RSLs - Commercial	Ambient Air Range (mid-1990's)
Benzene	121 $\mu\text{g}/\text{m}^3$	1.6 $\mu\text{g}/\text{m}^3$	0.42 $\mu\text{g}/\text{m}^3$	2 to 14 $\mu\text{g}/\text{m}^3$
Ethlybenzene	56.8 $\mu\text{g}/\text{m}^3$	4.9 $\mu\text{g}/\text{m}^3$	4.9 $\mu\text{g}/\text{m}^3$	Non-detect to 9 $\mu\text{g}/\text{m}^3$
TCE	48 $\mu\text{g}/\text{m}^3$	3 $\mu\text{g}/\text{m}^3$	3 $\mu\text{g}/\text{m}^3$	

Note that analysis at the time was reported in ppbv units for indoor air concentrations, which has the following chemical-specific factors to convert to $\mu\text{g}/\text{m}^3$: 3.19 for benzene, 3.34 for ethlybenzene and 5.37 for TCE.

EPA determined in the 2010 *Final Soil and NAPL Feasibility Study* that it was uncertain whether the indoor air exceedances were attributable to the ambient air, activities conducted within the buildings or vapor intrusion. EPA selected a remedy to protect occupants from vapor intrusion pathway in 2011. Given that the most recent indoor air data is 20 years old, it is difficult to determine whether the occupants of the buildings are currently protected. This remedy has not been implemented yet. EPA's understanding of vapor intrusion and indoor air sampling protocol has improved over the past five years, and EPA now recommends several sampling events representing different and/or conservative conditions. Additionally, EPA recommends multiple lines of evidence be collected to assess the potential for current and future vapor intrusion. This could include but are not limited to: building construction, building ventilation/operation, sub-slab soil vapor, and deeper near-building soil vapor.

The Waste Pit OU considered the potential for surface emission to impact residences at the fence line, and did not consider vapor intrusion pathway directly. The Waste Pit remedy OU selected a remedy that controlled emissions by an SVE system, and by a vapor collection layer in the RCRA cap that actively collects and treats vapors.

Toxicity Values

EPA's Integrated Risk Information System (IRIS) has a program to update toxicity values used by the Agency in risk assessments when newer scientific information becomes available. Since the remedy was selected, IRIS has revised toxicity values for several potential COCs identified in the risk assessment for the Waste Pits OU.

The Waste Pits OU establishes a performance standard for SVE cleanup that is tied to a fixed percentage of groundwater contamination concentration, rather than a fixed cleanup value for a specific COC. Therefore, the standard was not selected based on toxicity values, and therefore any changes in toxicity would not affect the protectiveness of the remedy.

For the Soil and NAPL OU, cleanup goals for outdoor soil and indoor air are based on the EPA RSLs.

In 2011, EPA conducted an updated assessment for TCE which included a risk of fetal cardiac malformations due to short-term in utero exposures to TCE as a result of inhalation. This IRIS assessment set a reference concentration (RfC) of 2 µg/m³. In 2014, EPA Region 9 issued a memorandum regarding *EPA Region 9 Interim Action Levels and Response Recommendations to Address Potential Developmental Hazards Arising from Inhalation Exposures to TCE in Indoor Air from Subsurface Vapor Intrusion* and EPA's Office Of Superfund Remediation and Technology Innovation issued a memorandum to the EPA Regional Superfund offices on *Compilation of Information Relating to Early/Interim Actions at Superfund Sites and the TCE IRIS Assessment*. There have not been any other changes to the RSLs since the 2011 ROD.

Ecological Review

An ecological risk assessment was performed for the Waste Pits OU when the State of California was the lead agency for the Site. That assessment concluded that no plant species listed as rare and endangered, or sensitive, were observed at the Site or in the immediate Site vicinity. EPA adopted these conclusions within the 1996 ROD for the Waste Pits OU.

An ecological risk assessment was included in the 2006 BRA for the Soil and NAPL OU that focused on evaluating risks to the local kestrel⁶ population, based on the sightings of individual kestrels inferred to be residing within an approximately 24-acre undeveloped area, of which approximately 15 acres are within the southern portion of the Site. The ecological risk assessment concluded that although adverse effects to an individual kestrel may occur from exposure to pesticides in surface soils from the on-site habitat, effects to the population are expected to be negligible.

No Site changes have occurred since the previous FYR that would change the results of the ecological assessment.

6.4. Data Review

6.4.1. Waste Pits Operable Unit

Soil Vapor Extraction

Soil vapor concentrations and remedy performance have undergone extensive evaluation following recommendations made in the previous FYR related to operations and maintenance. A Performance

⁶ A kestrel is bird of the falcon genus.

Monitoring Event (PME) was conducted for the SVE/IBT system from February 2012 through January 2013. The PME activities consisted of converting and operating the SVE/IBT system as an SVE-only system for a defined period of time (i.e., 5 and 10 pore volume sweeping events) and collecting soil vapor concentration measurements to evaluate system performance in terms of protection of groundwater, achievement of performance standards, and soil vapor rebound characteristics.

The PME operated for approximately 320 days, representing approximately 140 days of converting and operating in SVE-only mode, and 180 days of vadose zone rebound. Throughout this period, soil vapor samples were collected and analyzed for benzene, toluene, ethylbenzene, and xylene, among other VOCs (using Method 8260B) and fixed gases (e.g. oxygen, carbon dioxide using ASTM D-1946). Three different well types were sampled. Fourteen vacuum performance wells were used to collect soil vapor samples and to assess the pressure response to the SVE/IBT system. Thirteen cluster wells, distributed through the Site, were sampled to determine vertical gas profiles and evaluate possible downward migration of contaminants. These clusters contained three monitoring wells each, with screened intervals at elevations +10 feet above mean sea level (msl), 0 feet msl, and -10 feet msl. Twelve perimeter monitoring wells, installed around the perimeter of the Site cap, were used to monitor for any soil vapor movement laterally from the edges of the cap. The cluster well samples were analyzed for VOCs and the fixed gases utilizing on-site mobile laboratories. Perimeter and vacuum performance well samples were analyzed for VOCs and the fixed gases utilizing on-site mobile laboratories and/or screened in the field using a photoionization detector (PID), calibrated for benzene, and a multi-gas monitor for the fixed gases during the PME.

PME findings are reported in a series of Performance Monitoring Event Reports of Findings (PME ROF). The most recent report at the time of this FYR, covering 2013 data, is dated February 2014, although corresponding earlier reports and preliminary monitoring data from December 2014 were also reviewed. These reports present data and interpretations for soil vapor concentrations and groundwater concentrations within and beneath the Waste Pits OU. A summary of PME data is presented in Table 6-1.

Table 6-2. Cluster Wells and Vacuum Performance Wells Sub-Area Average Benzene Concentration Results during PME

Sampling Event	Sub-Area 1	Sub-Area 2	Sub-Area 3
Baseline (February 2012)	15922	25841	0.6
T0 ¹ (April 2012)	16100	21715	10.7
T1 ² (June 2012)	18903	16744	17.9
T15 ³ (July 2012)	17508	19770	33.6
T45 ⁴ (August 2012)	20462	35245	18.6
T90 ⁵ (September 2012)	20462	35245	54.4
T180 ⁶ (January 2013)	26394	31787	51

Sampling Event	Sub-Area 1	Sub-Area 2	Sub-Area 3
Average groundwater concentration (µg/L)	170500	281900	82100
Vapor concentration equivalent with groundwater	12200	20100	5900
Contingency Standard	7300	12100	3500
Soil Remediation Goal	870	1430	420

Results in parts per million (ppm_v) except where noted. These sub-areas were used to subdivide the Waste Pits OU for performance monitoring. Sub-area 1 includes the two westernmost pits, Pits 2F and 2E. Sub-area 2 includes Pits 2D, 2C, 2B, and 2A. Sub-Area 3 includes Pits 1C and 1B. Sub-Area 4 not monitored due to attainment of remedial goals.

¹ T0 – after initial 5 pore volume purge

² T1 – upon completion of the purge cycles (10 pore volumes)

³ T15 – 15 days after shut down

⁴ T45 – 45 days after shut down

⁵ T90 – 90 days after shut down

⁶ T180 – 180 days after shut down

PME results from the rebound test show that significant rebound in soil vapor concentrations did occur in each sub-area when SVE operations stopped. In Sub-Area 3, (Pits 1C and 1B), concentrations remained well below goal levels, even after rebound. In Sub-Areas 1 and 2 (Pits 2F, 2E, 2D, 2C, 2B, and 2A), concentrations were significantly above soil remediation goal levels throughout the PME.

Monitoring results for individual cluster wells generally show flat or upward concentration gradients, such that VOC vapor concentrations are consistent across the vertical profile or are higher close to the groundwater. This indicates that there is not a downward concentration gradient that would drive contaminant transport toward the groundwater. Additionally, benzene concentrations measured at the capillary fringe are in equilibrium with groundwater concentrations, based on Henry's Law. These observations indicate that it is not likely that soil vapor is impacting groundwater, but it is possible that vapors from equilibrium partitioning with groundwater are migrating up into the soil. For two cluster wells, high benzene concentrations at +10 feet msl were observed in association with localized contaminant sources, but vapor concentrations were not elevated at 0 feet msl or -10 feet msl, indicating that the SVE/IBT system has been effective at preventing downward migration of vapors from reaching groundwater at that well. Overall, the vertical vapor concentration gradients indicate that the remedy is functioning as intended to protect groundwater quality from being adversely affected by vertical contaminant transport through vapor migration.

Another aspect of the SVE/IBT system is its effluent emissions. The SVE/IBT system effluent limit was established as 5 ppm_v, based on the South Coast Air Quality Management District's (SCAQMD) allowable emission model used to determine allowable emissions of carcinogenic pollutants from stationary sources. The Waste Pits project was initially designed in 1998 and the allowable emission model was used at the time to calculate the allowable emissions for SVE/IBT system. Effluent concentrations measured in 2011 and 2012 prior to the PME period were non-detect (detection limit of 1.6 ppm_v) until the final sample prior to the PME period, which measured 12 ppm_v. After the PME period,

effluent concentrations in 2013 measured eight non detect readings (detection limit 0.005 ppm_v), one non detect reading with detection limit 0.0072, one reading of 0.0083 ppm_v, and one reading of 0.0019 ppm_v, and in 2014 measured two non-detect readings (detection limit 0.005 ppm_v), one non-detect reading with detection limit 0.006 ppm_v, and one reading of 0.29 ppm_v.

The final aspect of the SVE/IBT system that was evaluated was the perimeter monitoring. Data collected from 2011 through 2014 from all perimeter monitoring wells (using a PID), located on- and off-site, have shown very low to non-detect PID VOC readings. Four off-site perimeter wells in particular, wells I, J, K and L, are positioned to determine whether off-site contaminant migration is occurring in the direction of the neighboring residences. These wells are located approximately 200 feet south of the cap. Readings from these wells from 2011 through 2014 ranged from 0 to 1.0 ppm_v, with the majority of the readings being reported as 0 ppm_v. The baseline readings in these wells, taken during the 2 years before start of the SVE/IBT system, also ranged from 0 to 1.0 ppm_v. A review of the PID readings indicate no consistent trend with readings spiking and then returning to 0 ppm reading the next event. EPA's subsurface vapor intrusion screening level for benzene is 12 µg/m³ for residential exposure. Due to the non-selective screening PID measurements, this data cannot be used to evaluate vapor intrusion potential. Additionally, if the VOC PID reading of 1 ppm_v consisted entirely of benzene, it would equal to a benzene soil gas concentration of 3,190 µg/m³. The current sampling and analysis plan makes it difficult to determine if soil gas on the waste pits perimeter is a potential problem because the methodology is not appropriate for that purpose.

In the winter of 2015, EPA collected indoor air samples from 107 residential units south and southwest of the Del Amo property. Three properties adjacent to the park were included in the indoor air sampling program. The benzene concentrations in these homes were similar to the benzene concentrations collected outside the homes in the ambient air; indicating that vapor intrusion may not be a significant source. However, during the next phase of the investigation, which will include soil gas, vapor intrusion may be better defined.

Cap Gas

The cap gas system captures vapors that may accumulate beneath the cap by using a blower and a series of perforated pipes in the sand layer of the cap to extract vapors to two reactivated carbon vessels for treatment. In an effort to assess the efficiency and performance of the carbon units of the cap gas system, monitoring was conducted from four sample locations: (1) system influent, (2) effluent of the lead carbon vessel, (3) effluent of the secondary carbon vessel, and (4) system effluent. These samples were analyzed using a PID. The interval between monitoring events varied over the 2010-2013 period, although 2-5 sampling events per month was typical. A confirmation sampling event was scheduled once every five years to ensure the effectiveness of field monitoring. Complete data from these activities are available in the OM&M Annual Reports for 2010-2013; data on 2014 monitoring activities are not yet available. These reports cover field monitoring program results for soil vapor concentrations, cap gas, groundwater quality, water table elevation, and systems operation and maintenance.

VOC concentrations in gas collected by the cap gas system, as influent to the carbon treatment units, varied greatly over the 2010-2013 period, with a significant decline in concentrations observed from 2011 through 2013. In 2010, influent sample concentrations ranged from 0.3 parts per million (ppm_v) to 40 ppm_v, with an average concentration of 14.6 ppm_v. In 2011, influent sample concentrations ranged from 6.1 ppm_v to 80 ppm_v, with an average concentration of 38.2 ppm_v. In 2012, influent sample concentrations ranged from 0 ppm_v to 43.6 ppm_v, with an average concentration of 5.4 ppm_v. In 2013, influent sample concentrations ranged from 0 ppm_v to 3.0 ppm_v, with an average concentration of 0.56 ppm_v.

VOC concentrations in system effluent were also monitored, to assess treatment performance and ensure timely replacement of the carbon vessels. When VOC concentrations at the effluent of the cap gas system were greater than 5 ppm_v and/or when the lead vessel efficiency failed to meet performance standards, the carbon was replaced in order to ensure that the system is operating within compliance. In 2010, system effluent concentrations ranged from 0.0 ppm_v to 9.8 ppm_v, and the carbon beds were replaced seven times. In 2011, system effluent concentrations ranged from 0.0 ppm_v to 0.8 ppm_v, and the carbon beds were replaced 12 times; this high replacement rate corresponds to the high influent concentrations observed during this year. In 2012, system effluent concentrations ranged from 0.0 ppm_v to 0.2 ppm_v, and the carbon beds were replaced once. In 2013, system effluent concentrations ranged from 0.0 ppm_v to 0.9 ppm_v, and the carbon beds were not replaced. Low influent concentrations in the cap gas system during 2012-2013 equated to very little carbon usage, and operational compliance was met without frequent carbon changes.

The 5 ppm_v standard for effluent VOC concentrations is based on one tenth of the SCAQMD's allowable emission model which was used to determine allowable emissions of carcinogenic pollutants from stationary sources. The one tenth factor was utilized by the project as an additional safety factor. The Waste Pits project was designed in 1998 and the model was used then to calculate the allowable emissions for the SVE/IBT system at that time. The same standard was conservatively used for the cap gas collection system.

Overall, these data indicate that the cap gas system has been operating as designed; however, whether the emission standards remains protective cannot be ascertained with the available evaluations.

Groundwater Concentration

The Del Amo Waste Pits OU does not directly address the groundwater contamination, but the groundwater contaminant concentrations throughout the Dual-Site Groundwater OU are still relevant to this FYR since they inform interpretations of whether waste pits contaminants are migrating into the groundwater of the broader Dual-Site Groundwater OU. In this FYR, groundwater contaminant trends will only be referenced as related to possible contaminant migration; a more detailed analysis of the groundwater contaminant plume in the vicinity of this Site can be found in the forthcoming first FYR for the Dual-Site Groundwater OU of the Montrose Chemical and Del Amo Superfund Sites (2015).

Data for groundwater contamination within the geographic limits of the Waste Pits OU are available in PME ROF reports up through 2014 and in OM&M reports for 2010-2013. More extensive groundwater data for the broader dual-site area were obtained from a Groundwater Monitoring Report for the Dual-Site

Groundwater OU. This report, dated February 13, 2015, covers groundwater contamination for the combined Montrose Chemical and Del Amo Superfund Sites.

Throughout the dual-site area, there are multiple source areas for benzene and other VOCs, resulting in the existence of several comingled plumes. Certain local maxima in concentrations at the water table are associated with specific source areas; one of these local maxima is located in the vicinity of the waste pits, and is the result of historic contamination from the pits. Benzene concentrations in the vicinity of the waste pits have decreased or remained stable since the beginning of SVE/IBT operations in 2006; any reduction in concentrations is attributable to this remedy in conjunction with natural attenuation.

The groundwater data supports the conclusion made based on soil vapor data that VOC vapors from the waste pits are not contributing to further groundwater contamination. Generally stable to decreasing groundwater concentrations near the waste pits indicate that significant transport of contaminants into the water is not occurring. Rather, it is likely that the SVE/IBT operations in the waste pits vadose zone have led to indirect remediation of the groundwater by removing vapors released from the groundwater at the water table. Although this is not the primary intention of the SVE system, nor is it an efficient method of groundwater remediation, this is an incidental benefit of the SVE/IBT system. Overall, it is concluded that the remedy at the Waste Pits OU is protective of the groundwater, and that transport of contaminants from the waste pits to the groundwater is not occurring.

Water Table Elevation

Groundwater elevation data collected in February 2012 for the Dual-Site Groundwater OU Groundwater Monitoring Report indicate that the water table gradient is generally to the southwest, but with significant variability. In the area of the waste pits, the water table is relatively flat, but generally follows the regional gradient. The elevation of the water table at the waste pits has risen to approximately -8.61 to -9.81 feet msl, which represents an approximate 8-foot increase over the past 15 years. Based on this elevation data, some of the deeper soil-vapor monitoring points (-10 feet msl), as well as the deeper intervals of the SVE wells, are at or near the saturated zone, and are reportedly influenced by vapor off-gassing from groundwater. Current soil vapor concentrations in these wells are likely representative of the equilibrium partitioning from VOCs in the groundwater, and not representative of potential vapors originating from the waste pits.

Rising groundwater levels at the Site began to impact the SVE/IBT system as the water table began to approach the bottoms of the SVE wells. In the February 2014 PME ROF, it was recommended that all parameters of current system design and operation be reevaluated to determine if changes need to be made to optimize system performance and efficiency. In 2014, all existing SVE wells were decommissioned by pressure grouting and new wells were installed in response to the rising groundwater. The SVE/IBT system was then re-started.

6.4.2. Soil and NAPL Operable Unit

The remedy has not yet been implemented, and therefore no data has been generated for evaluation.

6.5. Site Inspection

A site inspection was conducted on November 14, 2014. FYR team members from USACE, Los Angeles District and the EPA RPM met with consultant C2REM, who operates the SVE/IBT system. A site walk was performed to inspect the condition of the Waste Pits cap, drainage features, and fencing. The SVE/IBT system was not operating at the time of the site inspection because of the installation of new wells for SVE/IBT system upgrade.

In general, the Waste Pits cap, drainage features, and fencing were in good condition. The vegetation on the cap has been allowed to die off due to drought conditions and on-site field work related to the SVE system upgrades. The SVE extraction wells, pumps, and pipelines are in good condition. A homeless encampment was observed west of the Site on the adjacent property. However, trespassing onto the Site has not been observed. Security fencing and motion activated lights have eliminated security breaches.

Additionally, the site inspection team viewed the areas where ISCO, SVE, and capping will take place as part of the Soil and NAPL OU remedy.

A trip report with site inspection details, including attendees and photographs and the site inspection checklist, are presented in Appendix E.

6.6. Interviews

During the FYR process, interviews were conducted with parties impacted by the Site, including the current landowners, regulatory agencies involved in Site activities or aware of the Site and interested members of the public. The purpose of the interviews was to document views of current Site conditions, problems, or successes with the phases of the remedy that have been implemented to date. The operators of the Waste Pit SVE/IBT system were conducted during the site visit on November 14, 2014. The public interviews were conducted during a large community outreach event on June 19-20, 2015. Following the event, EPA solicited the input of additional community members and stakeholders of which provided comments through telephone interviews or via e-mail. Interviews are summarized below, and complete interviews are included in Appendix D.

Members of the Del Amo Action Committee (DAAC), California Communities Against Toxics, and Clean Air Matters took the opportunity to be interviewed. Collectively, these interviewees had a few significant concerns:

- The sites and the contamination in the surrounding area are not being looked at holistically and coherently. There needs to be a holistic description of how all of the OUs fit together, and the community needs to know the plan.
- Working with EPA and getting meaningful information to the community has been difficult. There are so many sites with different RPMs, and they come and go due to the long-lasting nature of the

sites, that there is little consistency with the people involved; there's a lack of stewardship. EPA provides information in fragmented manner; there has not been adequate or consistent involvement with the community. Most people/stakeholders are not well-informed, and those who are have demanded to be. The community repository is too far from the community, and the repository and the website do not contain documents or information that is helpful to community members. EPA needs to find more creative and meaningful ways to involve the community and to help community members understand the issues.

- EPA had been previously unresponsive to comments provided by DAAC and others regarding remedy selection and implementation. EPA should be a real partner, and act in a collaborative way with all stakeholders to move the project ahead. Communication with key stakeholders should include more frequent technical updates and more transparency regarding the remediation design and implementation.

Several community members also provided comments. Residents are very concerned about the cleanup and the site and how it is affecting the health of their current and potential future families. Multiple community members indicated that no one informs people of the contamination prior to moving into the area, and that there needs to be some measure to make sure people are informed when considering buying or renting a property in the area. Several people did not feel well-informed about the Site. Additional community concerns are related the future use as a park of the fenced area between the houses and the Waste Pits. Several community members feel that this fenced area is unsafe.

DTSC provided comments, stating that they are not aware of or observed any adverse effects on the surrounding community caused by operation of the Del Amo Waste Pits and that the SVE/IBT is operating in accordance with the ROD. DTSC believes it is more informed than in recent past. DTSC notes that the PRP has relied on MNA to remediate benzene-contaminated groundwater. DTSC believes that because there is excessive LNAPL at several distinct locations at the Del Amo Superfund Site, EPA should require the PRP to address how the benzene mass will be reduced at both the source and groundwater plume areas. Overall, the timely implementation of the remedy for OU1 is a high priority for DTSC.

6.7. Institutional Controls

6.7.1. Waste Pits Operable Unit

The following table lists the associated with areas of interest at the Waste Pits OU.

Table 6-3. Waste Pits OU Institutional Controls Summary Table

Media	Institutional Controls Called for in the Decision Documents?	Impacted Parcel(s)	Institutional Controls Objective	Instrument in Place
Waste Pits	Yes	Lot 37	Restricts property from being used as a residence, hospital, private or public school, or daycare. The conveyee may not interfere with the remedial action within this parcel without prior notice to EPA or DTSC.	A deed restriction to restrict use of property is in place. (2005)
Waste Pits	Yes	Lot 36	Restricts property from being used as a residence, hospital, private or public school, or daycare. The conveyee may not interfere with the remedial action within this parcel without prior notice to EPA or DTSC.	A deed restriction to restrict use of property is in place (2000)

A title search was performed and confirmed that the deed restrictions presented in the table above are included in the property deed. A summary of title exceptions and their impacts is included in Appendix F Real Estate.

6.7.2. Soil and NAPL Operable Unit

The remedy includes four layers of institutional controls. The general goals of the institutional controls are to minimize the potential for future exposure to residual contamination at the site and protect the remedy. In addition, for parcels determined by EPA to exceed action levels for residential use, the institutional controls will:

- Prohibit residential use
- Prohibit interference with any other remedial activities within the property
- Prohibit drilling into and use of groundwater, if the property overlies groundwater contamination.

The action level for residential use is based on the BRA results and is any area with an excess cancer risk greater than 10^{-6} or a non-cancer hazard index greater than 1. Table 12-1 in the ROD shows each property area and its applicable institutional controls.

The ROD required the following institutional controls:

Informational Outreach

This includes mailings, websites, publically accessible databases, and other venues. The goal is to inform the public about the environmental condition of the Site and the controls and restrictions that are in place. The outreach will be accomplished by EPA, DTSC, and the potentially responsible parties.

Building Permit Review

In 2008, EPA implemented an Institutional Controls Pilot Program in cooperation with DTSC, the City of Los Angeles Department of Building and Safety and the City of Los Angeles Department of City Planning. This program involves an environmental review process prior to proceeding with any planned construction activities involving subsurface penetrations greater than 18 inches for specific parcels located within the Del Amo Site that have been identified by EPA.

The review process consists of the following:

- Building and excavation permit applicants are referred to EPA by Los Angeles Department of Building and Safety if work is located within specific parcels within the Del Amo Site.
- Applicants contact the EPA Environmental Review Team (ERT). The ERT consists of EPA, DTSC, and the Administrative Order on Consent respondents.
- The EPA ERT reviews construction plans to identify the locations and dimensions of any invasive activities.
- The EPA ERT reviews existing environmental and historical information for the property to evaluate whether soil contamination is known or suspected at the planned areas of soil disturbance. In some cases, additional sampling and testing of soil in the areas to be excavated may be appropriate prior to start of construction activities.
- Based on the results of the ERT review, EPA determines what measures are warranted before, during, and/or after construction for protection of human health and the environment.

This pilot program has been successful in ensuring that new developments are protected from Del Amo Site contaminants.

In the building permit review discussion in the ROD, the pilot program is selected as a component of the final remedy. Also, the permit review includes the expectation that the potentially responsible parties will serve as the point of contact for permit applicants; they will conduct an initial review of the proposed project and prepare a Screening Evaluation Summary Report. Based on the contents of this report, EPA determines if the project proceeds without further evaluation or requires additional evaluation. Based on existing data and results of any additional evaluation, remedial actions may be required and will be implemented in accordance with the ROD.

General Plan Footnote

This remedy component involves the application of a footnote to the General Plan for the Site for areas exceeding the action level for residential use. The footnote will state that the land is within the Del Amo Superfund Site and is not appropriate for residential use and remind future planners about the contamination.

Restrictive Covenants

The restrictive covenants required for Site properties are legal agreements entered into by the property owner and DTSC pursuant to California law. These covenants will run with the land and be binding upon all future owners and occupants. The covenants will be applied to properties exceeding action levels for residential use as described above. The covenants will include the following requirements:

- Residential use will be prohibited;
- Any construction or redevelopment plans involving excavation must obtain EPA review and approval prior to initiation of such work;
- Interference with remedial activities, system, or components will be prohibited, including both investigation and cleanup activities;
- Drilling into and use of groundwater will be prohibited without prior approval by EPA.

The institutional controls presented in the ROD have yet to be implemented.

7. Technical Assessment

7.1. *Question A: Is the remedy functioning as intended by the decision documents?*

Yes, the remedy for the Waste Pits OU is functioning as intended by the decision documents.

Monitoring of soil vapor concentrations and gradients in cluster wells indicate that the SVE/IBT system has been effective at preventing groundwater quality from being adversely affected by vertical contaminant transport through vapor migration. Additionally, VOC concentrations in groundwater at the Waste Pits OU are not increasing and do not differ significantly from those trends seen throughout the broader Dual-Site Groundwater OU. This indicates that transport of contaminants from the Waste Pits OU to the groundwater is not occurring, even though soil vapor concentrations remain above goal levels in the western half of the Waste Pits OU.

In 2012, there was one exceedance of the SVE/IBT treatment system effluent emission standard established in 1998, however, no further exceedances were experienced and it is operating as designed. The cap gas system also has been operating as designed. It is noted, however, the 5 ppm_v standard for VOC effluent emissions standard from both the SVE/IBT system as well as the cap gas system was established during the design in 1998 and may need to be updated using more current toxicity and

modelling procedures. In addition, the perimeter monitoring's current sampling and analysis plan makes it difficult to determine if soil gas on the waste pits perimeter is a potential problem because the detection limit of the field instrumentation used is not low enough, however, nearby residential sampling indicated that vapor intrusion may not be a significant source.

Deed restrictions are in place on the parcels associated with the Waste Pits OU that prohibit residential development and hospital or school/day care use. Overall, the monitoring data and in-place institutional controls indicate that the remedy is functioning as intended, and is protective of human health and the environment.

The Soil and NAPL OU remedy has yet to be implemented.

7.2. Question B: Are the exposure assumptions, toxicity data, cleanup levels, and Remedial Action Objectives used at the time of remedy selection still valid?

Yes. Based on the reviews conducted during this five year review, the cleanup levels, exposure assumptions, and RAOs used at the time of the remedy selection for both OUs are still valid. There have been no changes to risk assessment methods during this five year review period. Recent updated toxicity information for TCE identified a higher long-term cancer risk and a higher near-term non-cancer risk than previously assumed.

However, when examining the OU1 BRA, it was noted that indoor air measurements of contaminant concentrations from 1995 would be exceeding 2015 indoor air regional screening levels. The BRA did not utilize the indoor air data in calculating site-related risk due to elevated ambient levels of the same contaminants. Instead, the BRA relied upon soil, soil gas and groundwater data to model indoor air impacts to the buildings. The OU1 ROD then utilized this information to identify two buildings with actionable levels of indoor air contaminants (based on the modeling and confirmed with sub-slab sampling) and select remedial actions to address them. EPA's current practice is to collect indoor air samples to verify model assumptions. Although the remedy for OU 1 has not yet been implemented, it is necessary to assess previous vapor intrusion evaluations in light of current guidance, and implement a vapor intrusion sampling program where needed.

It is not known whether the SCAQMD's allowable emission model has changed since the Waste Pits project was initially designed in 1998, and remains protective. This model is used to determine allowable emissions of carcinogenic pollutants from stationary sources.

7.3. Question C: Has any other information come to light that could call into question the protectiveness of the remedy?

When examining the OU1 BRA, it was noted that indoor air measurements of contaminant concentrations from 1995 would be exceeding 2015 indoor air RSLs. The BRA did not utilize the indoor air data in calculating site-related risk due to elevated ambient levels of the same contaminants. Instead, the BRA

relied upon soil, soil gas and groundwater data to model indoor air impacts to the buildings. The OU1 ROD then utilized this information to identify two buildings with actionable levels of indoor air contaminants (based on the modeling and confirmed with sub-slab sampling) and select remedial actions to address them. EPA's current practice is to collect indoor air samples to verify model assumptions. Although the remedy for OU 1 has not yet been implemented, it is necessary to assess previous vapor intrusion evaluations in light of current guidance, and implement a vapor intrusion sampling program where needed.

7.4. Technical Assessment Summary

For the Waste Pits OU, the remedy components are functioning as intended. The SVE/IBT system has been effective at preventing groundwater quality from being adversely affected by vertical contaminant transport through vapor migration, even though soil vapor concentrations remain above goal levels in the western half of the Waste Pits OU. Additionally, VOC concentrations in groundwater at the Waste Pits OU are not increasing, and do not differ significantly from those trends seen throughout the broader Dual-Site Groundwater OU. The reported results from the soil vapor monitoring wells around the perimeter of the Site have detection limits that are too high to indicate whether soil gas around the waste pits perimeter is a potential problem, although nearby residential sampling indicated that vapor intrusion may not be a significant source. The cap gas system has been operating as designed; however, the 5 ppm_v standard for effluent VOC concentrations emission standard was established during the design in 1998 and may need to be updated using more current toxicity and modelling procedures. Deed restrictions are in place that prevent residential development and hospital or school/day care use. In addition, the exposure assumptions, toxicity data, and RAOs used at the time of the remedy selection are still valid. However, it is not known whether the SCAQMD model that was used to determine allowable emissions from the SVE/IBT and cap gas treatment system has changed since the Waste Pits systems were initially designed and whether it remains protective.

For the Soil and NAPL OU, the components of the remedy have yet to be implemented. The exposure assumptions, and RAOs used at the time of the remedy selection are still valid. The toxicity of TCE has changed, indicating a higher long term cancer risks and higher a near term non-cancer risk than previously assumed. However, it is noted that the indoor air contaminant concentrations measured in 1995 would be considered high by today's standards and that a vapor intrusion sampling program is needed.

8. Issues

Table 8-1 summarizes the issues identified during the FYR process for the Del Amo Superfund Site OU1 and OU2.

Table 8-1. Issues

Issue	Affects Protectiveness? (Y/N)	
	Current	Future
Waste Pits OU: It is not known whether the SCAQMD model that was used to determine allowable emissions from the SVE/IBT system and the cap gas treatment system remains protective since the Waste Pits remedial systems were initially designed in 1998.	N	Y
Waste Pits OU: The soil gas monitoring program for soil gas on the perimeter does not provide adequate information to assess whether the soil gas is a potential problem.	N	Y
Soil and NAPL OU: Vapor intrusion methodologies used may not be entirely consistent with current guidance and the contaminant concentrations measured in 1995 exceed current RSLs for Indoor Air.	Y	Y

9. Recommendations and Follow-up Actions

Issues and recommendations identified during the FYR process are presented in Table 9-1 below.

Table 9-1. Recommendations

Issue	Recommendations / Follow-up Actions	Milestone Date
Waste Pits OU: It is not known whether the SCAQMD model that was used to determine allowable emissions from the SVE/IBT system and the cap gas treatment system remains protective since the Waste Pits remedial systems were initially designed in 1998.	Review, and possibly update, the allowable emissions standard for carcinogenic air pollutants as it would apply to emissions from the Waste Pits OU.	2016
Waste Pits OU: The soil gas monitoring program for soil gas on the perimeter does not provide adequate information to assess whether it is a potential problem.	Modify perimeter sampling plan/design to be protective of vapor intrusion.	2016
Soil and NAPL OU: Vapor intrusion methodologies used may not be entirely consistent with current guidance and the indoor air contaminant concentrations measured in 1995 would exceed current RSLs for Indoor Air.	Assess previous vapor intrusion evaluations in light of current guidance, implement a vapor intrusion sampling program where needed.	2016

10. Protectiveness Statements

10.1. Waste Pits Operable Unit

The remedy at the Waste Pits OU is protective of human health and the environment. The cap is intact and the SVE system is working to prevent site vapors from entering into the groundwater. Institutional controls are in place that prevents exposures to Site contaminants. However, to be protective in the long-term, the SVE/IBT system and the cap gas treatment system emission standard needs to be reviewed and updated, and the sampling plan for the perimeter wells needs to be revised to be protective of vapor intrusion.

10.2. Soil and NAPL Operable Unit

A protectiveness determination of the remedy at Soil and NAPL OU cannot be made at this time until further information is obtained. Further information will be obtained by assessing previous vapor intrusion evaluations in light of current guidance and collecting indoor air samples at on-site buildings of concern. It is expected that these actions will take approximately a year to complete, at which time a protectiveness determination will be made.

11. Next Review

This is a statutory review required as long as waste is left on-site that does not allow for unlimited use and unrestricted exposure. The next FYR will be due within five years of the signature date of this FYR.

Figures

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Figure 3-1. Location Map for the Del Amo Superfund Site

Figure 3-2 Hydrostratigraphic Block Diagram

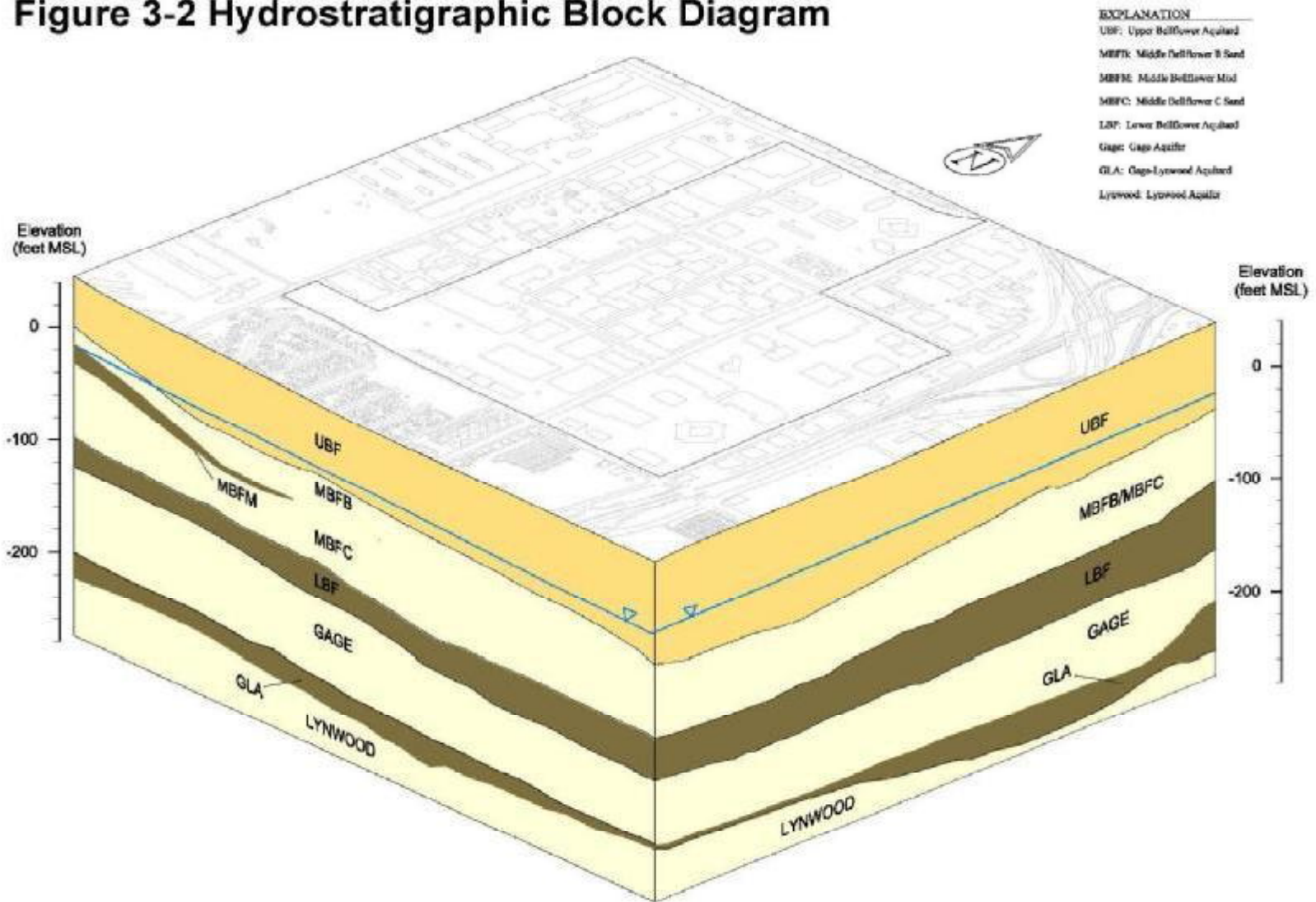


Figure 3-2. Hydrostratigraphic Block Diagram

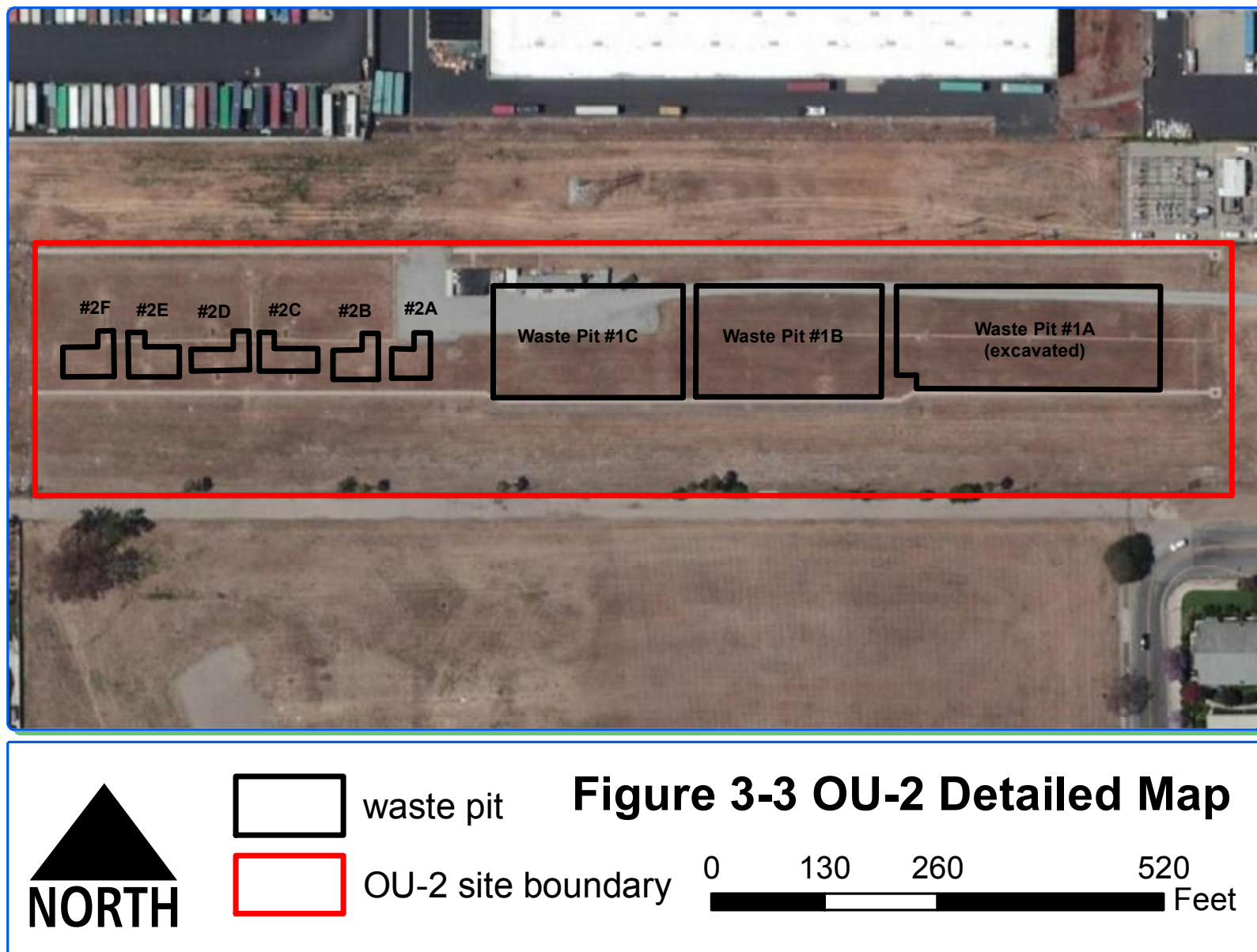


Figure 3-3. Detailed Map of the Waste Pits Operable Unit



Figure 3-4. Significant Release Areas

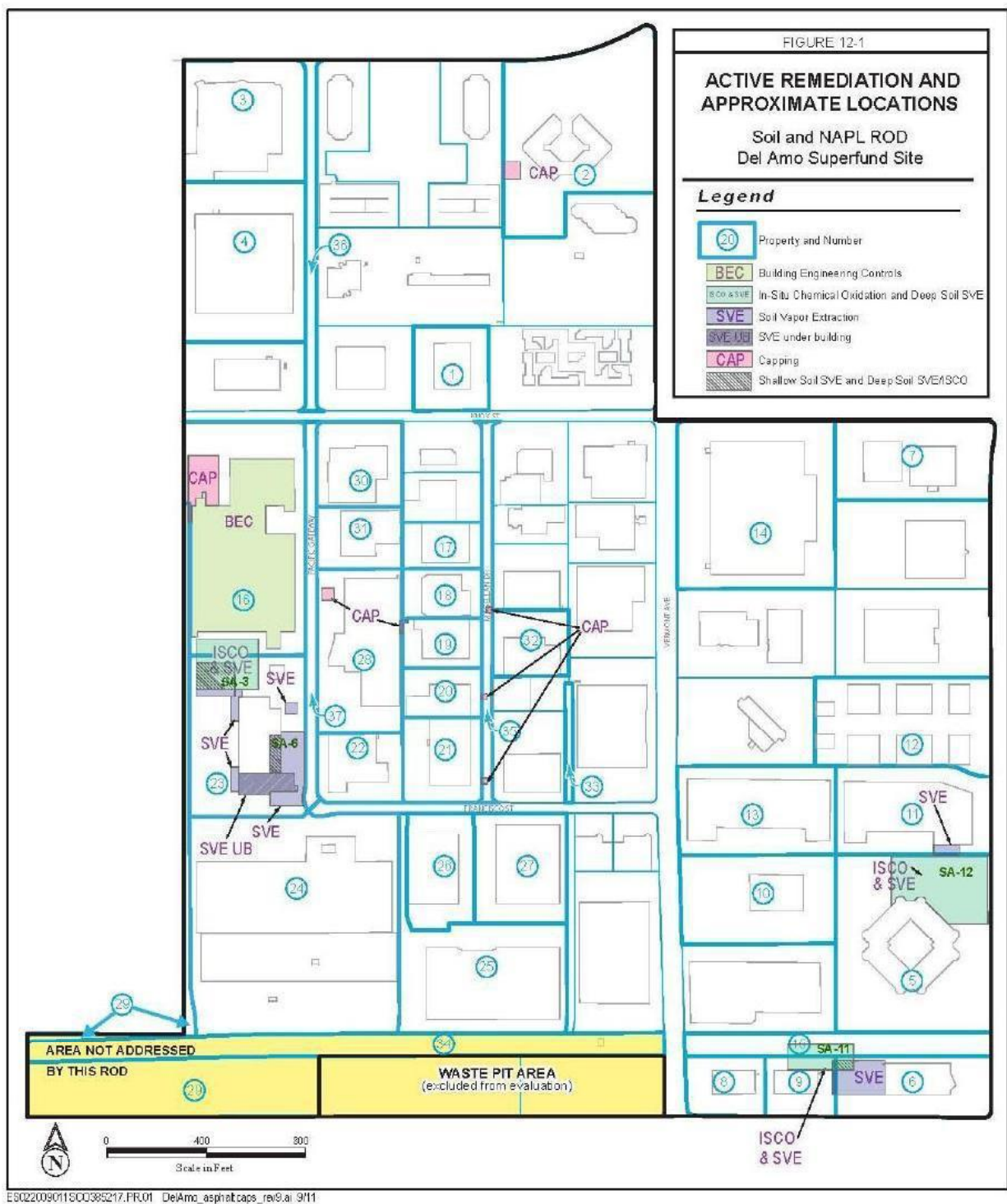


Figure 4-1. Remedial Action Areas in the Soil and NAPL Operable Unit

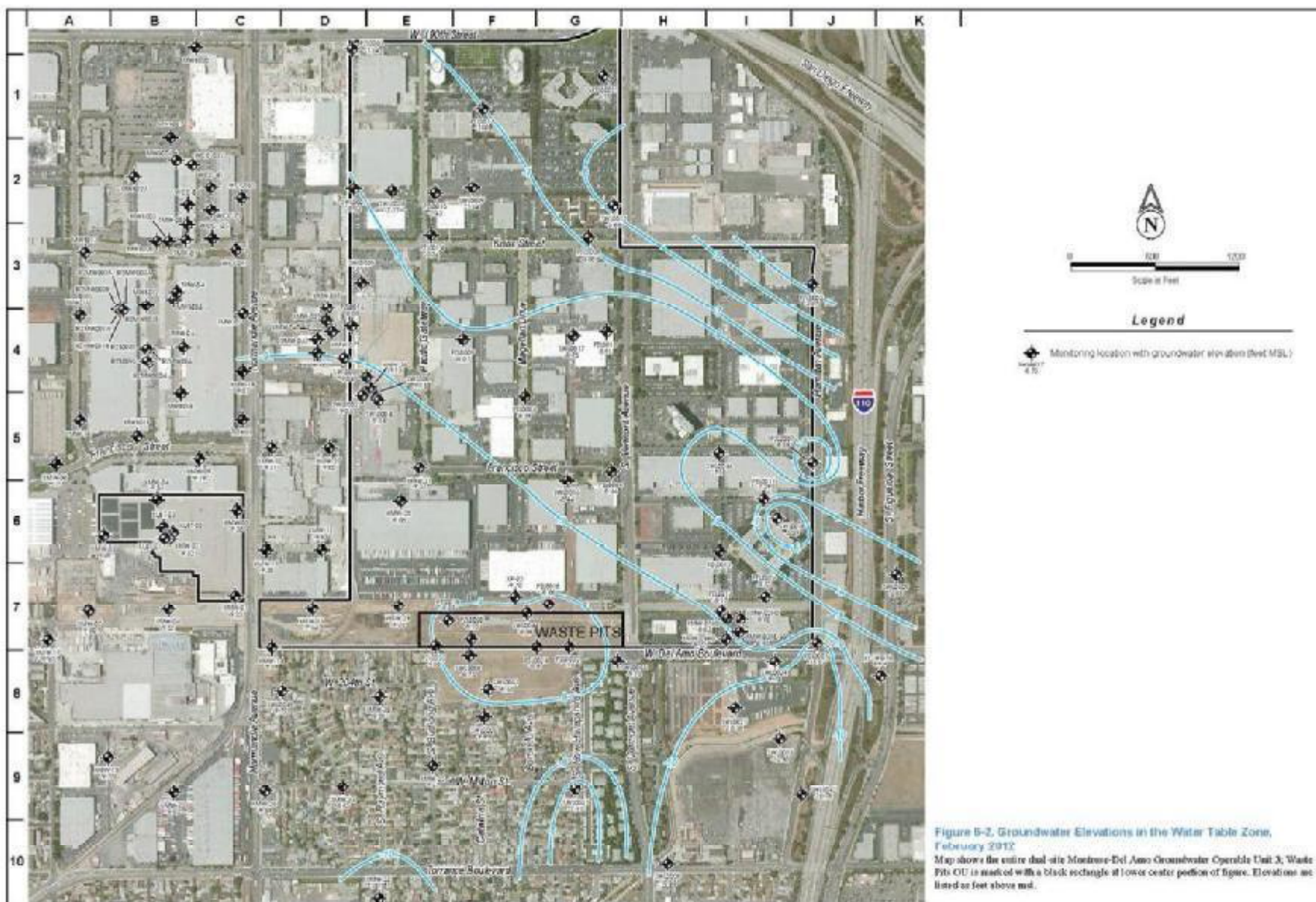


Figure 6-2. Groundwater Elevations in the Water Table Zone, February 2012

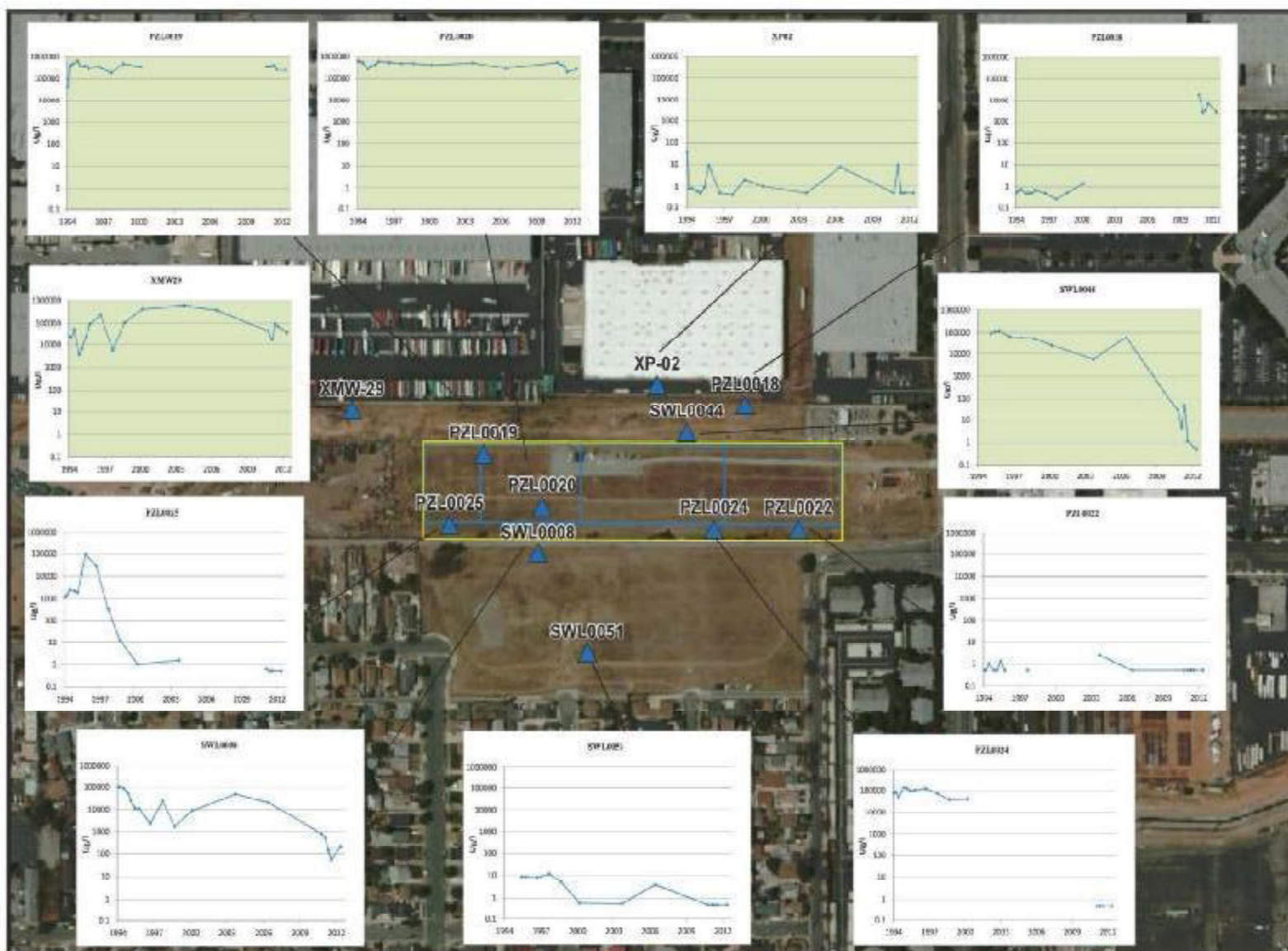


Figure 6-3. Groundwater Benzene Concentrations 1994-2012 in Waste Pits Area

Appendices

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Appendix A: List of Documents Reviewed

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List of Documents Reviewed

C2 REM 2011a, 2010 Operations, Maintenance & Monitoring Annual Report, Del Amo Waste Pits, Los Angeles, CA, Prepared for USEPA on behalf of the Del Amo Respondents, April 2011.

C2 REM 2011b, Waste Pits Operation, Maintenance, and Monitoring Manual, Del Amo Waste Pits, Los Angeles, CA, Prepared for USEPA on behalf of the Del Amo Respondents, September 2011

C2 REM 2012, 2011 Operations, Maintenance & Monitoring Annual Report, Del Amo Waste Pits, Los Angeles, CA, Prepared for USEPA on behalf of the Del Amo Respondents, May 2012.

C2 REM 2013, 2012 Operations, Maintenance & Monitoring Annual Report, Del Amo Waste Pits, Los Angeles, CA, Prepared for USEPA on behalf of the Del Amo Respondents, April 2013.

C2 REM 2014, 2013 Operations, Maintenance & Monitoring Annual Report, Del Amo Waste Pits, Los Angeles, CA, Prepared for USEPA on behalf of the Del Amo Respondents, July 2014.

C2 REM 2012, Performance Monitoring Event Report of Findings, Del Amo Waste Pits, Los Angeles, CA, Prepared for USEPA on behalf of the Del Amo Respondents, December 2012.

C2 REM 2013, Performance Monitoring Event Report of Findings, Del Amo Waste Pits, Los Angeles, CA, Prepared for USEPA on behalf of the Del Amo Respondents, April 2013.

C2 REM 2014, Performance Monitoring Event Report of Findings, Del Amo Waste Pits, Los Angeles, CA Prepared for USEPA on behalf of the Del Amo Respondents, February 2014.

GeoSyntec 2006, Baseline Risk Assessment Report, Del Amo Superfund Site, Los Angeles, CA, September 2006

EPA 2014, Construction Activities Being at Waste Pits In Los Angeles Factsheet, June 2014

EPA 2013, Del Amo Superfund Site Factsheet, March 2013

EPA 2011, Record of Decision, Del Amo Facility Superfund Site, Soil and NAPL Operable Unit, Los Angeles, CA, September 30, 2011.

EPA 2010, Second Five-Year Review Report for Del Amo Superfund Site Waste Pits Operable Unit, September 2010

EPA 2002, Explanation of Significant Differences, Del Amo Superfund Site, Operable Unit 2 – Waste Pits, Los Angeles, CA, August 2002.

EPA 2006, Explanation of Significant Differences #2, Del Amo Superfund Site, Operable Unit 2 – Waste Pits, Los Angeles, CA, August 2006.

EPA 1997, Record of Decision, Del Amo Waste Pits Operable Unit, Del Amo Facility Proposed Superfund Site, Los Angeles, CA, September 1997.

Montrose Chemical, *Draft Joint Groundwater Feasibility Study Montrose and Del Amo Sites, Los Angeles County, California Volume I – Text, Tables & Figures* (Montrose Chemical, 1997)

Site Evaluation Summary Report, December 2010.

Screening Evaluation Summary Report and Work Plan for Soil Sampling and Laboratory Testing, June 2011.

Site Evaluation Summary Report, April 2012

Site Evaluation Summary Report, November 2012

Site Evaluation Summary Report, December 2012

Site Evaluation Summary Report, May 2013

Site Evaluation Summary Report, June 2013

Screening Evaluation Summary Report, October 2014

URS, 2012. Groundwater Monitoring Report, Dual Site Groundwater Operable Unit, Montrose Chemical and Del Amo Superfund Sites, Los Angeles, CA, Prepared for Shell Oil Company, June 2012.

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Appendix B: Public Notice

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FIVE-YEAR REVIEW FOR DEL AMO SUPERFUND SITE

The United States Environmental Protection Agency (EPA) conducts regular evaluations of certain Superfund site cleanup remedies to determine if a cleanup is, or will be, protective of human health and the environment. These types of evaluations are called Five-Year Reviews (FYRs). If EPA's cleanup remedy leaves contaminated materials on site at levels that restrict the property's use, or if the cleanup remedy takes longer than five years to complete, the Superfund law requires a FYR to be conducted.

REVISIÓN DE CINCO AÑOS PARA EL SITIO DEL AMO SUPERFONDO

La Agencia de Protección Ambiental de los EE.UU. (EPA, por sus siglas en inglés) lleva a cabo evaluaciones regulares de remedios de limpieza de sitios Superfund para determinar si una limpieza protege, o protegerá, la salud humana y el medio ambiente. Estas evaluaciones se llaman Revisiones de Cinco Años (FYR). Si el remedio de limpieza de la EPA deja materiales contaminados en su lugar en niveles que limitan el uso de la propiedad, o si el remedio de limpieza tarda más que cinco años en completarse, la ley Superfund requiere que se realice una FYR.



Figure 1
*The Del Amo and Montrose
Chemical Superfund Sites*

Figura 1
*Sitios Superfund
Del Amo y Montrose*

EPA has begun the third FYR of the cleanup remedy at the Del Amo Superfund Site located in Los Angeles, CA.

A Superfund cleanup remedy is a long-term action that removes or substantially reduces hazardous substances in the environment.

La EPA ha comenzado la tercera FYR del remedio de limpieza para el Sitio Superfund Del Amo, ubicado en Los Ángeles, CA.

Un remedio de limpieza Superfund es una acción a largo plazo que elimina o reduce sustancialmente sustancias peligrosas en el medioambiente.

What is the purpose of a Five Year Review (FYR)?

During a FYR, EPA evaluates the cleanup remedy in order to determine if it is currently, or upon completion, will be protective of human health and the environment. For the Del Amo FYR, the United States Army Corps of Engineers will provide assistance to EPA in conducting the review.

During the FYR, we will

- Inspect the site;
- Review site documents and data;
- Identify any new information that could affect the protectiveness of the Superfund cleanup remedy; and
- Seek input from partner agencies and interested community stakeholders.

To determine whether a remedy is protective, we answer three key questions for the FYR:

- Is the remedy functioning as intended by the decision documents?
- Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?
- Has other information come to light that could call into question the protectiveness of the remedy?

¿Cuál es el propósito de una Revisión de Cinco Años (FYR)?

Durante una FYR la EPA evalúa el remedio de limpieza con el fin de determinar si protege, o protegerá, la salud humana y el medio ambiente. Para la FYR de Del Amo, el Cuerpo de Ingenieros del Ejército de los Estados Unidos proveerá asistencia a la EPA para conducir la revisión.

Durante la FYR, haremos

- Inspección del sitio;
- Revisión de documentos y datos del sitio;
- Identificar cualquier información nueva pueda afectar el nivel de protección de la limpieza; y
- Busca contribuciones de agencias y de miembros interesados de la comunidad.

Para determinar si un remedio sigue protegiendo la salud y el medioambiente, estaremos respondiendo a tres preguntas claves:

- ¿Está funcionando el remedio según lo previsto por los documentos de decisión?
- ¿Siguen siendo válidos los supuestos de exposición, los datos de toxicidad, los niveles de limpieza, y los objetivos de acción correctiva utilizados en la selección del remedio?
- ¿Ha salido a la luz otra información que podría poner en duda la protección ofrecida por el remedio?

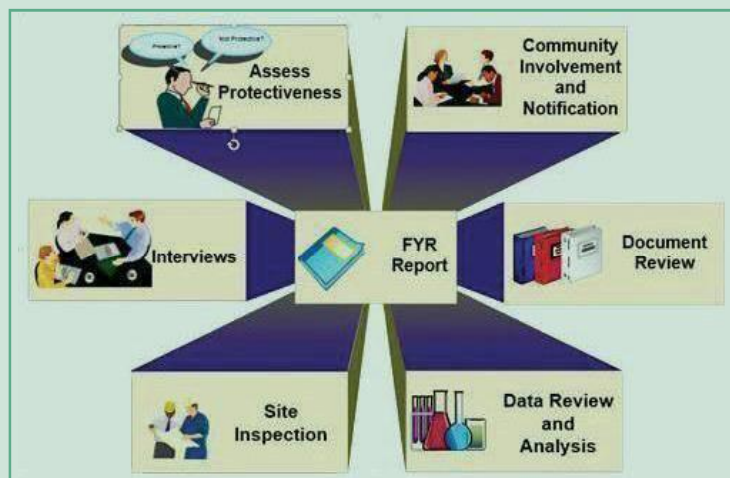


Figure 2
Five Year Review Process

Figura 2
El proceso de la Revisión de Cinco Años

At the conclusion of this process, a Five-Year Review report is produced. This report documents the review and concludes whether the remedies are working as intended or are expected to work as intended to protect human health and the environment.

A final report for the Del Amo Superfund Site is expected in October 2015. EPA will place the report in the local information repositories and post it on EPA's Del Amo website alongside the previous FYRs issued in 2005 and 2010, and on EPA's Montrose website for OU3, dual site groundwater.

What do we know about the site and the cleanup activities?

The Del Amo Superfund Site, located in Los Angeles, CA, is approximately 280 acres in a narrow strip of the city known as the Harbor Gateway neighborhood. The Del Amo Site was the location of a synthetic rubber plant which operated from 1943 to 1972. The Site is divided into three operable units (OUs): OU1, soil and non-aqueous phase liquids (NAPL); OU2, waste pits area; and OU3, dual site groundwater. OU3 dual site groundwater incorporates the co-mingled groundwater contaminants from both Del Amo and neighboring Montrose Superfund Sites. EPA has selected cleanup remedies for all three OUs (see Table 2, "Selected Cleanup Remedies," at the end of this factsheet).

During the operation of the rubber plant, sludge and liquid waste was placed in unlined waste pits and evaporation ponds for disposal. These unlined waste pits and evaporation ponds are referred to as the "waste pits area," or OU2.

Environmental investigations showed that the waste material had contaminated the surrounding soil and groundwater. The main chemicals of concern today are benzene and naphthalene, although other volatile organic compounds and semi-volatile compounds are present (see Table 1, "Primary Site-Related Contaminants"). The pesticide DDT and other chemicals related to its manufacture are also present as a result of activities at the neighboring Montrose Superfund Site.

In 2005 and 2010, EPA issued FYRs for the waste pits area (OU2) of the Del Amo Superfund Site. Both FYRs concluded that the remedy was protective of human health and the environment. For 2015, one FYR will be prepared for OU1 and OU2, and a second FYR will be prepared for OU3.

Al término de este proceso, se producirá un informe FYR. El informe documenta la revisión y concluye si los remedios están funcionando según lo previsto para proteger la salud humana y el medioambiente.

Se espera un informe final para el sitio Superfund Del Amo en octubre de 2015. La EPA pondrá el informe en los depósitos de información locales y lo publicará en el sitio web de la EPA para Del Amo al lado de los FYR anteriores de 2005 y 2010, y en el sitio web de la EPA para Montrose por el agua subterránea de ambos sitios.

¿Qué sabemos acerca del sitio y las actividades de limpieza?

El sitio Superfund Del Amo, ubicado en Los Ángeles, CA, consiste de aproximadamente 280 hectáreas en una zona angosta de la ciudad conocida como la vecindad Harbor Gateway. Del Amo fue sitio de una fábrica de caucho sintético que funcionó desde 1943 hasta 1972. El sitio Del Amo se divide en tres unidades operativas (UO): suelo UO1 y líquidos en fase no acuosa (NAPL); zona de piscinas de desechos UO2; y sitio de agua subterránea dual UO3. El sitio de agua subterránea dual UO3 incorpora los contaminantes del agua subterránea mezclado de ambos Sitios Superfund Del Amo y Montrose. La EPA ha seleccionado remedios de limpieza por todos los tres UOs (vea la Tabla 2, "Remedios de Limpieza Seleccionados" al final de esta hoja de información).

Durante la operación de la fábrica de caucho sintético, lodos residuales y desechos líquidos en pozos de desechos sin revestimiento y en estanques de evaporación para su eliminación. Hoy, se refiere a esta zona como el "área de los pozos de desechos," o UO2.

Las investigaciones ambientales mostraron que los desechos habían contaminado el suelo y el agua subterránea en el área. Los químicos de interés principales hoy en día son benceno y naftaleno, aunque otros compuestos orgánicos volátiles y compuestos semi-volátiles están presentes (vea Tabla 1, "Contaminantes Principales Relacionados con el Sitio.") El pesticida DDT y otros químicos relacionados con su fabricación también están presentes como resultado de las actividades en el sitio Superfund cercano llamado Montrose.

En el 2005 y el 2010, la EPA produjo FYRs para el área de los pozos de desechos (UO2) del sitio Del Amo. Ambas revisiones concluyeron que el remedio protege la salud humana

For more information on the protectiveness conclusions of these FYRs, please visit the Del Amo Site webpage. A link to this webpage is found at the end of this factsheet.

Table 1 Primary Site-Related Contaminants	
Operable Unit (OU)	Primary Site-Related Contaminants
OU1 – Soil and non-aqueous phase liquids (NAPL)	Arsenic, Benzene, Benzo(b) fluoranthene, Benzo(a) pyrene, Copper, 4,4-DDT, indeno(1,2,3-cd)pyrene, n-Nitrosodiphenylamine, Perchloroethylene (PCE), i-Propyltoluene, Trichloroethylene (TCE)
OU2 – Waste pits area	Benzene, Naphthalene
OU3 – Dual site ground water (includes Del Amo OU3 and Montrose Superfund Site OU3)	Benzene, Chlorobenzene, Parachlorobenzene Sulfonic Acid (pCBSA), PCE, TCE

What is happening with the groundwater treatment system?

The Torrance groundwater extraction and treatment system—located on South Normandie Avenue near the intersection of West 204th Street—is one component of the remedy for OU3 (see Table 2, “Selected Cleanup Remedies,” for all remedy components). The goal of the treatment system is to prevent contaminated groundwater from spreading and to reduce the overall amount of contamination. The design for the treatment system was completed in September 2012, and construction was completed in December 2014.

Currently, the start-up and commissioning of the treatment system—the process of turning on the system and ensuring all equipment installed is correctly functioning—is being conducted under EPA oversight.

y el medio ambiente.

Para más información sobre las conclusiones de protección de estas revisiones, por favor visita el sitio web de Del Amo. El enlace se encuentra el final de esta hoja.

Tabla 1 Contaminantes Principales Relacionados con el Sitio	
Unidad Operable (UO)	Contaminantes Principales Relacionados con el Sitio
UO1 - suelo y líquidos en fase no acuosa (NAPL)	Arsénico, Benceno, benzo[b]fluoranteno, benzo[a]pireno, cobre, 4,4-DDT, indeno[1,2,3-c,d]pireno, n-nitrosodifenilamina, i-propiltolueno, tetracloroetileno (PCE), tricloroetileno (TCE)
UO2 – Área de los Pozos de Deshechos	Benceno, Naftalina
OU3 – Agua Subterránea de Ambos Sitios (UO3 Del Amo y UO3 Montrose)	Benceno, Clorobenceno, para-Clorobenceno Ácido Sulfónico (pCBSA), PCE y TCE

¿Qué está sucediendo con el sistema de tratamiento del agua subterránea?

El sistema de extracción y tratamiento de agua subterránea – localizado en S. Normandie Ave. cerca del cruce de la calle West 204th St. – es una de las piezas del remedio para la UO3 (vea Tabla 2, “Remedios de Limpieza Seleccionados,” para todos los componentes de esta limpieza). El objetivo del sistema de tratamiento es evitar que el agua subterránea contaminada se propague y reducir la cantidad total de contaminación. El diseño para el sistema de tratamiento se finalizó en septiembre de 2012, y la construcción se completó en diciembre de 2014.

Actualmente, el inicio y encargo del sistema de tratamiento – el proceso de prender el sistema y asegurarse de que todos los equipos instalados están funcionando correctamente – se está llevando a cabo bajo la supervisión de la EPA.

What happens after the FYR?

After the FYR report is completed, EPA will place the report in the local information repositories and post it on EPA's web-site. If the FYR determines that cleanup goals are not being met, or identifies issues that affect current or future protectiveness, then EPA will evaluate such issues further to determine next steps.

How can the community be involved?

EPA is interested in hearing from the public. In many circumstances, the public has information critical to evaluate the protectiveness of a cleanup remedy. For the Del Amo Superfund Site, the public may have helpful information on all three OUs. Community members can provide feedback in a variety of ways. You can call, mail, or email any comments or concerns. In addition, you can participate in a phone interview. All written or verbal comments from individual community members will be part of the public record.

Here are some examples of helpful information that could be provided by community stakeholders:

- Broken fences, unusual odors, dead plants, materials leaving the Site, or other problems;
- Buildings, residential properties, or land around the Site being used in new ways;
- Any unusual activities at the site, such as dumping, vandalism, or trespassing; and
- Ways the cleanup at the Site has affected the neighborhood.

If you would like to be interviewed, have any concerns regarding the Site, or would like to receive future information, please contact a member of the team:

- **Dante Rodriguez**, Remedial Project Manager for Del Amo (OU1/OU2), at (415) 972-3166, or by email at: rodriguez.dante@epa.gov
- **Ray Chavira**, Remedial Project Manager for Montrose/Del Amo dual site groundwater (OU3), at (415) 947-4218, or by email at: chavira.raymond@epa.gov
- **Yolanda Sanchez**, Community Involvement Coordinator, at (415) 972-3880, or by email at: sanchez.yolanda@epa.gov

¿Qué sucede después de la FYR?

Una vez se finalizó el informe para la FYR, la EPA colocará el informe en los depósitos de información locales y lo publicará en el sitio web de la EPA. Si la FYR determina que las metas de limpieza no se están cumpliendo o identifica cuestiones que afectan la protección actualmente o en el futuro, se evaluarán las cuestiones más a fondo para determinar los próximos pasos.

¿Cómo puede participar la comunidad?

La EPA está interesada en la participación de la comunidad. En muchos casos, el público tiene información crucial para evaluar la eficacia de un remedio de limpieza. Para el Sitio Superfund Del Amo, el público podrá tener información útil en todas las UOs. Miembros de la comunidad podrán proveer comentarios en una variedad de maneras. Podrás llamar, mandar correo postal, o correo electrónico para entregar tus comentarios o preocupaciones. También podrías participar en una entrevista por teléfono. Todos los comentarios escritos o verbales de individuos de la comunidad serán parte del registro público.

Estos son algunos ejemplos de información importante que podrá proveer un miembro de la comunidad:

- cercas rotas, olores inusuales, plantas muertas, materiales saliendo del sitio, u otros problemas;
- edificios, terrenos, o residencias alrededor del sitio que se están utilizando en nuevas formas;
- actividades inusuales en el sitio, como tirando basura, vandalismo, o allanamiento; y
- información sobre cómo la limpieza en este sitio ha afectado a la vecindad.

Si a usted le gustaría hacer una entrevista, tiene preguntas acerca del sitio, o desea recibir más información, por favor póngase en contacto con un miembro del equipo:

- **Dante Rodríguez**, (En Español) Gerente del Proyecto de Remediación de Del Amo (OU1 / UO2), a (415) 972-3166 o por correo electrónico a: rodriguez.dante@epa.gov
- **Ray Chavira**, Gerente del Proyecto de Remediación del sitio dual de agua subterránea Montrose / Del Amo (UO3), a (415) 947-4218, o por correo electrónico a: chavira.raymond@epa.gov
- **Yolanda Sánchez**, Coordinadora de Participación Comunitaria, a (415) 972-3880, o por correo electrónico a: sanchez.yolanda@epa.gov

**Please visit one of the site's
information repositories for
additional information:**

Carson Public Library
151 East Carson Street
Carson, CA 90745
(310) 830-0901

Torrance Civic Center Library
3301 Torrance Boulevard
Torrance, CA 90503
(310) 618-5959

Superfund Records Center
Mail Stop SFD-7C
95 Hawthorne St., Room 403
San Francisco, CA 94105
(415) 536-2000

More information will be published on the EPA Del Amo www.epa.gov/region09/delamo or Montrose www.epa.gov/region09/montrose Site websites.

**Por favor, visite uno de los repositorios
de información del sitio para obtener
información adicional:**

Biblioteca Publica Carson
151 East Carson Street
Carson, CA 90745
(310) 830-0901

Biblioteca del Centro Cívico de Torrance
3301 Torrance Boulevard
Torrance, CA 90503
(310) 618-5959

Centro de Registros Superfund
Mail Stop SFD-7C
95 Hawthorne St., Room 403
San Francisco, CA 94105
(415) 536-2000

Más información será publicada en los sitios web de la EPA para Del Amo (www.epa.gov/region09/delamo) y Montrose (www.epa.gov/region09/montrose).

Table 2: "Selected Cleanup Remedies"

Operable Unit	Environmental Media	Record of Decision (ROD) signed in	Components of the Remedy
OU1	Soil and non-aqueous phase liquids (NAPL)	September 30, 2011	<ul style="list-style-type: none"> • Institutional controls (ICs): informational outreach; building permit review; General Plan footnote, and restrictive covenants (Status: In place) • Capping for impacted shallow outdoor soils in four areas (Status: Under design) • Building engineering controls (BECs) for VOC-impacted, shallow soil under the building in one area (Status: Under design) • Soil vapor extraction (SVE) for VOC-impacted, shallow outdoor soil in three areas (Status: Under design) • Soil vapor extraction (SVE) for VOC-impacted, shallow soil under the building in one area (different than the BECs above) (Status: Under design) • In-situ chemical oxidation (ISCO) and SVE for deep soil and groundwater in NAPL-impacted groundwater in three areas (Status: Under design) • For areas of contamination encountered in the future during redevelopment and construction: excavation or BECs, capping, or SVE, and Restrictive Covenants. (Status: Under design)
OU2	Waste pits area	September 5, 1997	<ul style="list-style-type: none"> • Institutional control (IC): deed restrictions (Status: In place) • A Resource Conservation and Recovery Act (RCRA) cap (Status: In place) • Surface water controls (Status: In place) • Soil vapor extraction (SVE) with in-situ bioventing (Status: In place) • Security fencing (Status: In place)
OU3	Dual site groundwater (includes Montrose Superfund Site OU3)	March 30, 1999	<ul style="list-style-type: none"> • Containment and isolation of non-aqueous phase liquid (NAPL) (Status: pending) • Groundwater extraction, treatment, and reinjection of treated water (Status: pending) • Technical impracticability (TI) waiver (Status: In place) • Groundwater monitoring (Status: In place)

Tabla 2: "Remedios de Limpieza Seleccionados"

Unidad Operable	Materiales Ambientales Afectados:	El Registro de Decisión (ROD) fue firmado:	Componentes del Remedio
OU1	Suelo y líquidos en fase no acuosa (NAPL)	30 de Septiembre, 2011	<ul style="list-style-type: none"> • Controles Institucionales (CI): el compartir de información; revisión de permisos de construcción, nota en el Plan General, y cláusulas contractuales restrictivas (Estado: Activo) • Capa para suelos exteriores superficiales afectadas en cuatro áreas (Estado: Bajo diseño) • Controles de ingeniería del edificio (BECs) para suelo poco profundo impacto por VOCs, bajo el edificio en un área (Estado: Bajo diseño) • Extracción de vapores del suelo (SVE) para el suelo poco profundo impactado por VOCs en el aire libre, en tres áreas (Estado: Bajo diseño) • Extracción de vapores del suelo (SVE) en el suelo poco profundo impactado por VOCs, bajo el edificio en un área (diferente a las BECs arriba) (Estado: Bajo diseño) • Oxidación química in situ (ISCO) y SVE para el suelo y las aguas subterráneas profundas en el agua subterránea impactada por NAPL en tres áreas (Estado: Bajo diseño) • Para las áreas de contaminación encontradas en el futuro durante la remodelación y construcción: excavación o BEC, tapado, o SVE, y Convenios restrictivos (Estado: Bajo diseño)
OU2	Área de piscinas de desechos	5 de Septiembre, 1997	<ul style="list-style-type: none"> • Control Institucional (IC): Cláusula Contractual Restrictiva (Estado: Activo) • Capa de Ley de Conservación y Recuperación de Recursos (RCRA) (Estado: Activo) • Controles de agua superficial (Estado: Activo) • Extracción de vapores del suelo (SVE) con bio-ventilación in situ (Estado: Activo) • Cerca de Seguridad (Estado: Activo)
OU3	Aguas subterráneas de los sitios duales	30 de Marzo, 1999	<ul style="list-style-type: none"> • La contención y aislamiento de líquidos en fase no acuosa (NAPL) (Estado: Pendiente) • Extracción de aguas subterráneas, tratamiento y re-inyección de agua tratada (Estado: Pendiente) • Renuncia de imposibilidad técnica (TI) (Estado: Activo) • Monitoreo de Aguas Subterráneas (Estado: Activo)

United States Environmental Protection Agency, Region 9
75 Hawthorne Street (SFD-6-3)
San Francisco, CA 94105
Attn: Yolanda Sanchez (Del Amo 6/15)

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For More Information

For more information, or to be added to the site mailing list, please contact:

EPA contacts:

Dante Rodriguez
Remedial Project Manager for Del Amo (OU1/OU2)
(415) 972-3166
rodriquez.dante@epa.gov

Ray Chavira
Remedial Project Manager for Montrose/Del Amo dual site groundwater (OU3),
(415) 947-4218
chavira.raymond@epa.gov

Yolanda Sanchez
Community Involvement Coordinator
(415) 972-3880
sanchez.yolanda@epa.gov

EPA contacts:

Dante Rodriguez
Gerente del Proyecto de Remedación de Del Amo (OU1 / OU2)
(415) 972-3166
rodriquez.dante@epa.gov

Ray Chavira
Gerente del Proyecto de Remedación del sitio dual de agua subterránea Montrose / Del Amo (UO3)
(415) 947-4218
chavira.raymond@epa.gov

Yolanda Sánchez
Coordinadora de Participación Comunitaria
(415) 972-3880
sanchez.yolanda@epa.gov

Appendix C: ARARs Analysis

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1997 ROD Applicable or Relevant and Appropriate Requirements Evaluation (ARARs).						
Requirement	Citation	Document	Description	Effect on Protectiveness	Comments	Amendment Date
California Code of Regulations	22 CCR Part 261	1997 ROD	Criteria for indentifying hazardouse waste	This citation is not found in current regulations.		
California Code of Regulations	22 CCR § 66262.11	1997 ROD	Hazardous waste determination by generators	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66262.34	1997 ROD	Accumulation time of hazarous waste on-site	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.14 (a), (b)	1997 ROD	Hazardous waste facility general security requirements	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.15	1997 ROD	General hazardous waste facility inspection requirements	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.17	1997 ROD	Hazardous waste facility general requirements for ignitable, reactive or incomplete wastes	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.25	1997 ROD	General hazardous waste facility seismic and precipitation design standards	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.31	1997 ROD	Hazardous waste facility design and operation for prepardness and prevention of release or occurances that could threaten human health or the environment	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.32	1997 ROD		No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.33	1997 ROD		No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.34	1997 ROD		No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.35	1997 ROD		No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.37	1997 ROD		No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.51	1997 ROD		No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.52	1997 ROD	Hazardous waste facility contingency plan and emergency procedures	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.53	1997 ROD		No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.54	1997 ROD		No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.55	1997 ROD		No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	CCR § 66264.56	1997 ROD		No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66264.111	1997 ROD	Hazardous waste facility closure performance standard	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66264.114	1997 ROD	Hazardous waste facility disposal or decontamination of equipment, structures and soil during closure and post-closure	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66264.117	1997 ROD	Hazardous waste facility post-closure care and use of property	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66264.119	1997 ROD	Hazardous waste facility post-closure notices	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66264.171-178	1997 ROD	Use and management of containers	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66262.34	1997 ROD	Hazardous waste accumulation time for pre-transport requirements	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66264.228	1997 ROD	Closure and postclosure care for surface impoundments at hazardous waste facilities	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66264.310	1997 ROD	Closure and post-closure care for landfills at a hazardous waste facility	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66264.1101	1997 ROD	Design and operating standards of containment buildings at hazardous waste facilities	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66268.1	1997 ROD	Purpose, scope and applicability of land disposal restrictions for hazardous wastes	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Change without regulatory effect amending subsection (e)(5).	2010
California Code of Regulations	22 CCR § 66268.3	1997 ROD	Dilustion prohibited as a substitute for treatment	No changes made to this requirement since the last FYR. Protectiveness is not affected.		

1997 ROD Applicable or Relevant and Appropriate Requirements Evaluation (ARARs).						
Requirement	Citation	Document	Description	Effect on Protectiveness	Comments	Amendment Date
California Code of Regulations	22 CCR § 66268 Articles 4, 10 and 11	1997 ROD	Land disposal restrictions treatment standards for hazardous waste	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Change without regulatory effect in 66268.40 and .48. Editorial correction in 66268.49.	2012
California Code of Regulations	22 CCR § 66268 Articles 10	1997 ROD	Land disposal prohibitions of specific non-RCRA hazardous waste	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66268 Articles 11	1997 ROD	Treatment standards for Non-RCRA waste categories	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
Clean Air Act South Coast Air Quality Management District (SCAQMD)	Rule 401	1997 ROD	Visible Emissions	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
Clean Air Act SCAQMD	Rule 402	1997 ROD	Nuisance	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
Clean Air Act SCAQMD	Rule 403	1997 ROD	Fugitive Dust	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
Clean Air Act SCAQMD	Rule 473	1997 ROD	Disposal of Solid and Liquid Wastes	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
Clean Air Act SCAQMD	Regulation X NESHAP	1997 ROD	National emission standards for hazardous air pollutants, benzene	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
Clean Air Act SCAQMD	Regulation XI - Rule 1150.2	1997 ROD	Control of gaseous emissions from inactive landfills, source specific standards	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Rescinded by SCAQMD Governing Board.	10-Apr-98
Clean Air Act SCAQMD	Regulation XI - Rule 1166	1997 ROD	VOC emissions from decontamination of soil, source specific standards	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
Clean Air Act SCAQMD	Regulation XIII - Rule 1303	1997 ROD	Attainment of State and Federal ambient air quality standards for a new source review	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
Clean Air Act SCAQMD	Regulation XIII - Rule 1401	1997 ROD	New Source Review of Carcinogenic Air Contaminants	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Add new and revise existing non-cancer chronic and acute risk values for acetaldehyde, acrolein, arsenic, fluorides, formaldehyde, manganese, and mercury to Table I of Rule 1401	10-Sep-10
Clean Air Act SCAQMD	Regulation XIV	1997 ROD	Toxics and other non-criteria pollutants	No changes made to this requirement since the last FYR aside from those within Regulation XIV listed below. Protectiveness is not affected.	No changes were made to all but three rules in Regulation XIV. See below for those rules that were changed since the last FYR.	
Clean Air Act SCAQMD	Regulation XIV - Rule 1415	1997 ROD	Reduction of refridgerant emissions from stationary air conditioning systems	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Retain all provisions for reducing refrigerant emissions from air conditioning systems only. In addition, expands scope of rule to include all high global warming potential refridgerants, and allows an extended leak repair period where a certified tech is not available or needs parts unavailable within 14 days of detection. Remove provision requireing use of certified tech when conducting leak inspections.	3-Dec-10

1997 ROD Applicable or Relevant and Appropriate Requirements Evaluation (ARARs).						
Requirement	Citation	Document	Description	Effect on Protectiveness	Comments	Amendment Date
Clean Air Act SCAQMD	Regulation XIV - Rule 1415.1	1997 ROD	Reduction of refridgerant emissions from stationary refridgeration systems	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Eestablish more frequent leak inspections and utilize best practices in refrigerant management and system maintenance. Further, PR 1415.1 will align AQMD's program with the statewide rule (Refrigerant Management Program) by adopting all provisions in the state regulation pertaining to the control of high global warming potential refrigerant emissions and consolidate all emission control requirements for stationary refrigeration systems currently in Rule 1415.	3-Dec-10
Clean Air Act SCAQMD	Regulation XIV - Rule 1470	1997 ROD	Requirements for stationary diesel-fueled internal combustion and other compression ignition engines	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Proposed Amended Rule 1470 is a rule relaxation. The proposed amended rule eliminates the current requirement for Tier 4 NOx and HC standards for all new emergency standby engines, and Tier 4 NOx, - 3 - HC, and PM standards for all new direct drive flood pump engines and all new direct drive fire pump engines. In addition, currently Rule 1470 requires all new and replaced emergency standby engines to meet Tier 4 PM emission standards.	4-May-12

Applicable or Relevant and Appropriate Requirements Evaluation (ARARs) specified in ESD-1 Waste Pits.						
Requirement	Citation	Document	Description	Effect on Protectiveness	Comments	Amendment Date
California Code of Regulations	22 CCR §66261.1-3, 21, 24	ESD-1 Waste Pits	Identification and listing of hazardous waste	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Change without regulatory effect to 66261.3 (2010) and .21 (2012)	7/23/2010 & 2/21/2012
California Code of Regulations	22 CCR § 66261.4	ESD-1 Waste Pits	Identification and listing of hazardous waste, exclusions	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Change without regulatory effect (2010). Adoption of new subsection amendment (2012 & 2014).	2010 and 2014
California Code of Regulations	22 CCR §66264.190,192, 193, 195, 196	ESD-1 Waste Pits	Tank system standards for hazardous waste facilities	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66264.94	ESD-1 Waste Pits	Concentration limits for water quality monitoring and response programs for permitted facilities	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Amendment to (b)(1) describing approval of different concentration limits for different monitoring points in the same medium to describe background conditions.	5/12/2011
California Code of Regulations	22 CCR § 66264.97	ESD-1 Waste Pits	General water quality monitoring and system requirements for monitoring and response programs at permitted facilities	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Amendment of subsection (b)(3), new subsections (b)(8) and (c)(3), amendment of subsections (d)(1) and (d)(4)-(5), new subsection (d)(7), amendment of subsections (e)(4), (e)(6), (e)(8)(E)3., (e)(8)(E)6., (e)(9)(E) and (e)(12)(B)-(e)(15) and amendment of Note	4/12/2011
California Code of Regulations	22 CCR § 66264.98	ESD-1 Waste Pits	Detection monitoring program at permitted facilities	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Amendment of subsections (f), (k)(1)-(3), (k)(5)(A), (k)(7)(A) and (n)(2) and amendment of Note	4/12/2011
California Code of Regulations	22 CCR § 66264.99	ESD-1 Waste Pits	Evaluation monitoring program at permitted facilities	No effect to protectiveness. Remedial activities will comply with provisions of these	Amendment of subsections (e)(3) and (e)(6) and amendment of Note	4/12/2011
California Code of Regulations	22 CCR §66264.600-602	ESD-1 Waste Pits	Hazardous waste facility miscellaneous units applicability, standards, and actions	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR §66264.700-708	ESD-1 Waste Pits	Environmental monitoring and response programs for air, soil, and soil-pore gas for permitted hazardous waste facilities	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR §66264.1030-1036	ESD-1 Waste Pits	Air emission standards for process vents at hazardous waste facilities	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	22 CCR §66264.1050-1065	ESD-1 Waste Pits	Air emission standards for equipment leaks at hazardous waste facilities	No changes made to this requirement since the last FYR. Protectiveness is not affected.		

Applicable or Relevant and Appropriate Requirements Evaluation (ARARs) specified in ESD-1 Waste Pits.						
Requirement	Citation	Document	Description	Effect on Protectiveness	Comments	Amendment Date
California Code of Regulations	22 CCR §66265.400-406	ESD-1 Waste Pits	Chemical, physical, and biological treatment at hazardous waste sites	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
California Code of Regulations	HSC Div 20 Chapter 6.5 Article 4 § 25143.2	ESD-1 Waste Pits	Hazardous waste control listings for recyclable materials	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
South Coast Air Quality Management District	SCAQMD Rule 463	ESD-1 Waste Pits	Organic liquid storage	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Amendment allows the determination of true vapor pressure for low volatility petroleum products by using flash point and percent volume loss. The proposed amendment updates the vapor tightness definition to reflect a detection limit of 500 ppmv rather than 1000 ppmv, consistent with Rule 1178. The proposed amendment also includes additional administrative changes to further clarify rule requirements, streamline recordkeeping and reporting requirements, and improve overall compliance.	4-Nov-11
South Coast Air Quality Management District	SCAQMD Rule 466	ESD-1 Waste Pits	Pumps and compressors	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
South Coast Air Quality Management District	SCAQMD Rule 466.1	ESD-1 Waste Pits	Valves and flanges	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
South Coast Air Quality Management District	SCAQMD Rule 467	ESD-1 Waste Pits	Pressure relief devices	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
South Coast Air Quality Management District	SCAQMD Rule 476	ESD-1 Waste Pits	Steam generating equipment	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
South Coast Air Quality Management District	SCAQMD Rule 1146	ESD-1 Waste Pits	Emissions of oxides of nitrogen from industrial, insitutional and commercial boilers, steam generators, and process heaters	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Changes to the rule will not affect emission limits or result in any adverse environmental, socioeconomic, or cost impacts.	1-Nov-13
South Coast Air Quality Management District	SCAQMD Rule 1146.1	ESD-1 Waste Pits	Emissions of oxides of nitrogen from small industrial, insitutional and commercial boilers, steam generators, and process heaters	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Changes to the rule will not affect emission limits or result in any adverse environmental, socioeconomic, or cost impacts.	1-Nov-13

Applicable or Relevant and Appropriate Requirements Evaluation (ARARs) specified in ESD-1 Waste Pits.						
Requirement	Citation	Document	Description	Effect on Protectiveness	Comments	Amendment Date
South Coast Air Quality Management District	SCAQMD Rule 1146.2	ESD-1 Waste Pits	Emissions of oxides of nitrogen from large water heaters and small boilers and process heaters	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
South Coast Air Quality Management District	SCAQMD Rule 1173	ESD-1 Waste Pits	Control of volatile organic compound leaks and releases from components at petroleum facilities and chemical plants	No changes made to this requirement since the last FYR. Protectiveness is not affected.		
South Coast Air Quality Management District	SCAQMD Rule 1176	ESD-1 Waste Pits	VOC emissions from wastewater systems	No changes made to this requirement since the last FYR. Protectiveness is not affected.		

Chemical specific Applicable or Relevant and Appropriate Requirements Evaluation (ARARs) specified in 2011 ROD Del Amo Soil and NAPL OU						
Requirement	Citation	Document	Description	Effect on Protectiveness	Comments	Amendment Date
California Code of Regulations	22 CCR § 66261.21	2011 ROD	Ignitability characteristics for hazardous waste	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Change without regulatory effect repealing subsections (a)(3) and (a)(4), adopting new subsections (a)(3)-(a)(4)(A)4. and new Notes 1-4 and amending subsection (b)	2/21/2012
California Code of Regulations	22 CCR § 66261,.22(a)(1), 23, 24(a)(1), and 100 [40 C.F.R. sections 261.20 – 24]	2011 ROD	Corrosivity, reactivity, and toxicity characteristics of hazardous waste	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66261.101(a)-(d)	2011 ROD	Identification and listing of Non-RCRA Hazardous Waste	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
California Code of Regulations	22 CCR § 66264.1030, 1032-1034	2011 ROD	Air emission standards for process vents at hazardous waste facilities	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
State Water Resources Control Board	SWRCB Order 2009-0009-DWQ §§ III, V, VI, IX, X, XI, XII, XIII and XIV	2011 ROD	NPDES permit for storm water discharges associated with construction and land disturbance activities one or more acres in size.	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		Order expired September 2, 2014.
Code of Federal Regulations	40 CFR § 264.340 – 343, 345, 347, and 351. See also 22 CCR § 66264.340-343, 345 (substantive portions), 347, and 351.	2011 ROD	Incinerators	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
Code of Federal Regulations	40 CFR § 264.600-603	2011 ROD	Miscellaneous unit defined under 40 C.F.R. 260.10	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
Code of Federal Regulations	40 CFR § 265.370, 373, 375, 377, 381, and 382. See also 22 CCR § 66265.370, 373, 375, 377, 381, and 382.	2011 ROD	Thermal treatment of hazardous waste	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
Code of Federal Regulations	40 CFR 61.01(a)(c)(d), Subpart J, sections 61.110 and 112; see also SCAQMD Regulation X, Subpart J	2011 ROD	Process equipment that treats liquids or vapors containing >10% weight hazardous air “HAPs” and is a potential source of air emissions of HAPs.	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
SCAQMD	SCAQMD Regulation XIV, Rule 1401	2011 ROD	Discharge to air containing toxics	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		

Location Specific Applicable or Relevant and Appropriate Requirements Evaluation (ARARs) specified in 2011 ROD Del Amo Soil and NAPL OU						
Requirement	Citation	Document	Description	Effect on Protectiveness	Comments	Amendment Date
Code of Federal Regulations	40 CFR § 264.18(b); see also 22 CCR § 66264.18(b)	2011 ROD	Standards for hazardous waste facilities in floodplains	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		

Action specific Applicable or Relevant and Appropriate Requirements Evaluation (ARARs) specified in 2011 ROD Del Amo Soil and NAPL OU							
Action	Requirement	Citation	Document	Description	Effect on Protectiveness	Comments	Amendment Date
Onsite waste generation	Code of Federal Regulations	40 CFR § 262.11; see also 22 CCR § 66262.11	2011 ROD	hazardous waste determination	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
Hazardous waste accumulation	Conditions for accumulation of waste on-site for 90 days or less.	40 CFR 262.34; see also 22 CCR Section 66262.34	2011 ROD	Accumulation time standards for generators of hazardous waste	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
Landfills, Capping of wastes in place	Capping of hazardous wastes in place to prevent migration to groundwater. Minimize migration of liquids through cap Promote drainage and minimize erosion	40 CFR 264.310; 22 CCR 66264.310 40 CFR 264.228; 22 CCR 66264.228	2011 ROD	Closure and post-closure care for landfills at hazardous waste facilities	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
Requirements for land use covenants	Land use covenants with appropriate restrictions must be executed and recorded.	22 CCR 67391.1(a) and (d)	2011 ROD	Land use covenant requirements for hazardous waste propert and land use restrictions	No effect to protectiveness. Remedial activities will comply with provisions of these regulations.	Change without regulatory effect in 66268.40 and .48. Editorial correction in 66268.49.	1/7/2013
Discharge to air	Limits visible emissions from any point source	SCAQMD Regulation IV, Rule 401	2011 ROD	Visible emission to atmosphere.	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
	Requires prevention, reduction, or mitigation of fugitive dust.	SCAQMD Regulation IV, Rule 403	2011 ROD	Activity capable of generating fugitive dust.	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		

Action specific Applicable or Relevant and Appropriate Requirements Evaluation (ARARs) specified in 2011 ROD Del Amo Soil and NAPL OU							
Action	Requirement	Citation	Document	Description	Effect on Protectiveness	Comments	Amendment Date
	Limits particulate emissions.	SCAQMD Regulation IV, Rule 404	2011 ROD	Discharge of particulate matter into the atmosphere.	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.		
	Limits particulate emissions from a combustion source to 0.1 grain per standard cubic foot at 12% CO2 averaged over 15 minutes	SCAQMD Regulation IV, Rule 409	2011 ROD	Combustion exhausts	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.	Applicable to thermal oxidation or internal combustion technologies for SVE treatment.	
	Standard of Performance for Stationary Spark Ignition Internal Combustion Engines	SCAQMD Regulation IX, Subpart JJJJ	2011 ROD	New sources	Minor revisions were made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.	Relevant and appropriate if EPA chooses internal combustion technology for SVE treatment during remedial design.	6-Apr-12
	Limits VOC emissions from soil excavations	SCAQMD Regulation XI, Rule 1166	2011 ROD	VOC emissions from decontamination of soil	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.	If site-related contamination is encountered in the future, this ARAR applies to the excavation remedy.	
	New Source Review	SCAQMD Regulation XIII, Rule 1303(a)	2011 ROD	New emissions source or modification of existing source	No changes made to this requirement since completion of the 2011 ROD. Protectiveness is not affected.	If emissions from SVE treatment technologies would exceed thresholds, Best Available Control Technology would be required to limit emissions.	

Appendix D: Interviews

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Community Involvement

Del Amo and Montrose Superfund Sites Groundwater OU, Torrance, CA

Introduction

The U.S. Environmental Protection Agency (EPA) coordinated a large community outreach event on June 19 – 20, 2015 in the nearby community. A week prior to the event, EPA had mailed postcards to residences in the community to inform them of the event. EPA established a mobile information center (MIC) at 1100 on June 19 at the corner of W. 204th St. and Budlong Ave to allow for community members to learn about the site, ask questions, and be interviewed for the Five-Year Review (FYR) if desired. U.S. Army Corps of Engineers (USACE) personnel were present to perform interviews for inclusion to the FYR. Additionally, EPA staff went door to door in the community to invite residents to visit the MIC and provide input to the FYR or get other information about the site. During the canvassing effort, EPA staff provided comment cards (a blank example can be found at the end of this appendix) and fact sheets (also at the end of this appendix) to allow residents a convenient way to provide input to the FYR. Completed comment cards could be dropped off at the MIC or mailed to EPA's San Francisco office.

During the two-day effort, EPA staff knocked on over 500 doors, and more than 25 people visited the MIC to talk with EPA staff. EPA staff was able to have crucial conversations with key leaders of the Del Amo Action Committee (DAAC), a local community organization focused on these sites and others in the area. Additionally, EPA staff was able to speak with 14 residents regarding the results of the recent vapor intrusion investigation. During the event, USACE interviewed four key community members and received three completed comment cards. An additional comment card was received following the field event.

Following the outreach event, DAAC e-mailed EPA and USACE a list of community members that DAAC would like for USACE to interview for the FYR. Of the 15 community members on the list, eight had already been interviewed (4 people), provided a comment card (1 person), spoke to EPA staff during door-to-door visits (1 person), visited the MIC (1 person), or e-mailed a request for comment (1 person; no response). Additionally, DAAC identified several community partners that they would like to be interviewed for the FYR.

On July 8th, 2015, USACE e-mailed requests for comments to several community partners, including California Communities Against Toxics (CCAT), Clean Air Matters (CAM), Berkeley University, the Water Replenishment District of Southern California (WRDSC), and the California Department of Toxics Control (DTSC). CCAT, CAM, and WRDSC replied. Members of CCAT and CAM were interviewed via telephone on July 10th and July 13th, respectively. WRDSC provided written responses to the request for comment on July 17th. DTSC provided written responses to the request for comment on July 30th.

Between July 16th and July 20th, USACE reached out via telephone or e-mail to four of the seven community members left on DAAC's list, but received no responses. Between July 2 and July 9, 2015, EPA conducted additional field visits to speak with the other three community members, and sent a follow-up e-mail to one of those with no response.

A record of all of the community input is provided below.

Del Amo Action Committee

In-person interview at the MIC on June 19th, 2015

DAAC Member 1 had several significant concerns:

1. It is unclear if the Montrose treatment system was designed to address contamination from the ILM and Boeing plumes in the nearby area that are part of a larger commingled plume. She was concerned that either the treatment system won't be effective for those plumes, or that those plumes would impinge on the ability of the treatment system to treat the Montrose/Del Amo groundwater.
2. She stated that the lack of agreement in place to maintain the treatment system is a serious problem.
3. pCBSA was given an unacceptably high standard in the ROD. EPA tests have shown that the treatment system will not decrease pCBSA concentrations even to the ROD level. Adequate treatment should be provided in the treatment train.
4. She was concerned that more extraction wells would be needed to control migration. Groundwater has moved past the point where the model said it would. What happens if 700 gpm cannot be achieved?
5. She suggested that EPA should investigate other options for positive reuse. For example, as drinking water, industrial water, or aquifer recharge.
6. The TI waiver zone is a problem because it won't be cleaned up in the residents' lifetimes; people feel powerless.
7. The sites in the area are not being looked at holistically and coherently, but rather in a piecemeal fashion.

Del Amo Action Committee

In-person interview at the MIC on June 19th, 2015

DAAC member 2 felt that the site is "orphaned." With such a long-lasting site, people come and go; there is no consistency with the people involved. There's a lack of stewardship. People who move to the area are not aware of the site issues and that's a problem. It's also difficult to get people to understand when they don't have any background. The public website and repository are a hodgepodge of various information and are not incredibly helpful, but the public needs access to the data to make their own judgments and EPA needs to find more creative ways to help people understand the issues. OU1 isn't being addressed and that's concerning. The TI Waiver zone is confusing and it should be revisited. People are living on top of it, so new remedies should be looked at. There needs to be a holistic description of how all of the OUs fit together and the community needs to know the plan.

Del Amo Action Committee

In-person interview at the MIC on June 19th, 2015

DAAC member 3 answered the questions on the comment card in list form:

1. Generally, the Site has been mismanaged. There has been a large gap between the ROD and the completion of the RS, which is a failure. The treatment plant is incapable of treating pCBSA to protective levels. pCBSA has been found at levels higher than originally thought, and changes to the pCBSA standard could cause changes to the treatment system. Montrose thinks they can reinject waster with 25 ppm when the DTSC level is 3 ppm; DAAC is trying to keep them from turning on the system for this reason. Don't believe that doing anything is doing something. Regarding the TI Waiver, cost is being put before the community; people shouldn't be living on top of contamination like that given the long remediation timeframes of the proposed remedies; we don't know where EPA will be in the future. The community has been kept in limbo a long time regarding vapor intrusion. Vapors are coming off the groundwater and are coming from industry in the region. It has been a hard fight to assure that people are being protected. Also, there are too many OUs with different managers, etc. Things are complicated and can't possibly come together to form a holistic solution, though EPA has stated that it would. It's confusing how the remedy for OU3 is going to make everything better; we shouldn't pretend that the other OUs don't exist or aren't priorities. The waste pits remedy is very concerning; worried that it will continue to contaminate groundwater. Other available technologies should be looked at. Members of the community have had severe health problems, and she wonders if they are related to the Sites. EPA presents information in a fragmented manner, which gives people the feeling that they're not being protected. The community has not been getting straight answers about vapor intrusion or the park, and they're exhausted; it's confusing to put in a park in a community that may need to be relocated.
2. For the waste pits, the location of the carbon regeneration is important. It's not good enough to incinerate it. The community is now more in tune with what is going on at the sites, and the sites need a real evaluation, not more sacrifices. Installation of the groundwater treatment system was a nightmare. It was a year of noise and stress. Trying to get information was difficult. Contractors were initially not monitoring for VOCs as required, and subsequent sampling was biased. It was very traumatic for the community.
3. The treatment could be more robust if the community wasn't here. The presence of the contamination is dangerous to the community, and relocation should be considered. Additionally, there needs to be a comprehensive strategy for the Sites.
4. The waste pits caught on fire when it was being capped. Also, someone stole electrical equipment from the waste pits when construction was occurring.
5. Yes, because she has demanded to be well-informed. People have had to be demanding to keep informed. Some at EPA are better at informing the community than others.

Resident 1

In-person interview at the MIC on June 19th, 2015

Resident 1 answered the questions on the comment card in list form:

1. Resident 1 indicated that, though EPA is courteous and communication has improved, the communication has generally been slow, inconsistent, and sometimes misleading, especially regarding the vapor intrusion results. People in the area had issues during the treatment plant construction and there is graffiti all over, but fences around the site are mended quickly. He stated that the OU3 remedy is a joke; to spend \$22 million on a water treatment plant that doesn't work... EPA should be working to fix the pCBSA issue, and should take a conservative position to protect the community. The TI Waiver just keeps getting renewed; no one is being held accountable for it. Resident 1 was not informed about the site before moving in, and suggests that there needs to be something to inform people prior to moving in or buying a property; even signage near the treatment plant would help. Lots of houses are in the

TI waiver zone, but there is no deed restriction. Based on the data, vapor intrusion appears to be occurring in his house; will air filtration be provided? This is of utmost importance because he wants to have a family and is concerned about contamination affecting the health of potential children. There is a need for testing and retesting for vapor intrusion since contamination remains. There needs to be an objective look to make sure that proper vapor intrusion testing procedures are being followed.

2. Resident 1 noted that the road replaced as a result of extraction system piping construction is loud and is torn up; the quality of the road is poor. He indicated that the treatment system should not be turned on before it can be effective, and that EPA could be more expedient in coming up with the best solution for the community. The fact that there is no accountability for the TI Waiver zone has been demoralizing and is demeaning to the community.
3. See questions 1 and 2.
4. The area has high gang activity; graffiti occurs often and fences get cut (though are quickly mended). Waste in the area is picked up quickly.
5. Because of the community involvement, EPA puts on a good face, but there are some honesty and consistency issues. EPA is not very timely with their information either. Resident 1 is grateful for the information he does receive, but has to validate the information he receives.

Resident 2

Comment card provided during outreach event

Resident 2 wants to be contacted regarding any concerns about construction of the park or with any questions about the area in general. He would also like to receive information about events and buildings in the park.

Resident 3

Comment card provided during outreach event

Resident 3 indicated that she hadn't received any information about the site except in the week prior. She is worried about the cleanup and the health of her grandchildren. She noted that she hadn't noticed any change in the water, and that she hadn't observed any vandalism in the neighborhood.

Resident 4

Comment card provided during outreach event

Resident 4 answered the questions on the comment card in list form:

1. The remedy for the Waste Pits (OU2) was made in 1997, 18 years ago, and according to two Five-Year Reviews is functioning according to plan. However, in 18 years, new problems that affect groundwater contamination and residents, such as vapor intrusion, DNAPL, and pCBLA have emerged that were not considered in the original OU2 remedy. The frightening part for residents is how these toxins may be interacting. Generally, they are moving in a southeast direction under homes.
2. The responsible parties (RPs) are protected by the TI Waiver, which should be examined rigorously because it lets the RPs off lightly.
3. Land-use restrictions should be evaluated for the residential area in unincorporated LA County, as well as for the Waste Pits area in the LA City area.

4. The increasing number of contaminants and movement in the southeast direction under homes has a negative effect on the psyche of the community. Parents are very concerned about their children growing up in the area, especially woman who are pregnant. As a result, home values have dropped, owners are not informing prospective tenants, and low income people don't have the resources to move.
5. Politicians responsible for the area need to be informed of the Five-Year Review so they can give input on issues, such as the deed restrictions for occupancy and future development.

Resident 5

Comment card provided following outreach event

Resident 5 was concerned that the fence around the waste pits site was penetrable; that people walk their dogs, ride bikes, and operate ATVs on the site. Resident 5 also wants to receive an e-mail or phone call because she has questions regarding her health status as it relates to the site, and the health status of her children.

California Communities Against Toxics

Telephone interview on July 10th, 2015

Regarding the Dual Groundwater Plume, CCAT member 1 laid out several of the biggest problems. First, the commingled groundwater plume contains pCBSA, which has a cleanup level in the ROD that is too high. Since the plan is to reinject water, a toxicological profile and/or other studies should be completed to assess the effects of reinjection. Comments along these lines were provided to EPA, but EPA was not responsive. Furthermore, the remedy does not even meet the specifications of the ROD regarding pCBSA removal, and then new action levels have been set. The remedy will have to be retrofitted because it has been shown that it isn't going to work. CCAT member 1 indicated that a stakeholder process should be put in place to collaborate and move forward to get to a revised remedy. Without EPA working with the community on the ground, public health issues and construction of remedies that won't be successful will continue. Furthermore, CCAT member 1 noted that the groundwater is still expanding, and would like to see interception of the toe of the plume.

Regarding the DNAPL, CCAT member 1 indicated that as EPA was trying to move towards a remedy, EPA received comments that not all available technologies were evaluated. Electrical resistance heating (ERH) was chosen. However, the remedy selection needs to be informed by the soil vapor intrusion investigation; COCs were detected in almost every house tested, so the remedy should be reconsidered in light of the vapor intrusion data. Existing conditions are not protective of human health. CCAT member 1 reiterated that the issue could have been avoided if only EPA had listened and been responsive.

Regarding the stormwater lateral, CCAT member 1 indicated that people are relying on the LA RWQCB to ensure that there is not residual contamination in stormwater runoff. This was a significant problem in the past, but she is uncertain if it still is. Was the response action at the waste pits adequate for addressing this?

Regarding the shallow soils and soil gas on the Montrose site, CCAT member 1 noted that soil characterizations indicated that it is not protective of human health and the environment, that people

would still be exposed because it hasn't been remediated, and that redeveloping for residential land use is inappropriate. She was disappointed in EPA's response that it was ok to put a school on a site that has not been remediated (though the school was not built).

Generally, CCAT member 1 wants to get EPA to be a real partner, to act in a collaborative way with all stakeholders to move the project further, saying that it's in everyone's best interest.

Clean Air Matters

Telephone interview on July 13th, 2015

The following questions were asked:

1. What are your overall impressions, comments, or suggestions about the management and operation of the site?
2. What effects have operations at the waste pits and construction of the groundwater system had on the surrounding community?
3. Are you aware of any community concerns regarding the Site? Any regarding operations at the waste pits? Any regarding the newly built groundwater system? If so, please give details.
4. Are you aware of any events, incidents, or activities at the waste pits or groundwater treatment plant such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.
5. Do you feel well-informed about the Del Amo Superfund Site's activities and progress?
6. Do you have any relevant information that may aid in our review?

CAM member 1 replied as follows:

1. Broadly, it's a mess. The Sites have been in the cleanup process for decades. She is troubled that not much work has gone forward for many portions of the site where exposure pathways exist. Specifically, OU1 and OU2 have plans in place that have not gone forward; the timeline is concerning. The slow progress at OU 3 and its remedial timeline are problematic, and further segmenting OU3 is a concern. There has not been adequate or consistent involvement with the community. There is not a stable information repository in the community, and EPA presence is not consistent or stable, which leads to confusion on behalf of the community and delays in the project.
2. There is concern about the groundwater extraction and treatment system being adequate for the task, with the decision to leave NAPL in place forever. The decision to reinject groundwater containing pCBA outside the existing groundwater plume is concerning; short-term expediency appears to have prioritized over long-term impact. Additionally, contractor failure to monitor VOCs during construction prior to Cynthia contacting EPA may be representative of how a lot of things have happened, and brings up broader questions about oversight; it might be indicative of more systemic issues. Furthermore, the way the construction of the groundwater treatment plant was set up prevented some customers from entering businesses. EPA responded that there was nothing that they could do about it. Understanding the needs of the local businesses and communities is important in taking actions. This speaks to a broader inability to manage community expectations, impacts, and experiences around actions that EPA is responsible for; it seems like EPA does not care.
3. In addition to the pCBA and whether the newly built treatment system is adequate to the task, the timeframe of the remedy is problematic. Because of the decision to leave DNAPL in

place, ultimately the goal is to prevent it from spreading; based on review of the FS, the groundwater system will need to operate 3,100 to 4,800 years. The community was understandably concerned about the timeline, but EPA didn't understand why the community was concerned. There is always going to be a groundwater plume under residences with highly volatile compounds, there is currently evidence of vapors in some homes but EPA is still figuring out where the vapors are coming from, and there is always the possibility that there could be vapor intrusion in the future. The community is always at risk for vapor intrusion since the remediation timeframe is so long, and there needs to be a robust system that monitors vapor intrusion until cleanup is complete. Additionally, there hasn't been adequate consideration of new pathways developing via earthquakes.

4. No.
5. CAM member 1 knows more than most about the Site, but does not feel well-informed by EPA.
 - a. There really needs to be a complete information repository available inside the community. The current repository is too far from the community, and that creates a barrier to engagement. Given that community involvement is important, having the document on a CD isn't the same as having a printed document, document summaries, or people to ask questions to.
 - b. Breaking down the site into so many pieces (OUs) makes it difficult for the community to completely understand. Who can keep up? Competent community involvement is paramount.
 - c. EPA's handling of the Sites has made it difficult for the community to remain engaged. There are different RPMs for each OU, which makes it difficult for each community member to be adequately involved. Furthermore, EPA shows up in ways that are hard to interact with.
6. CAM member 1 suggested that comments from the Technical Assistance Services for Communities (TASC) technical assistance providers regarding vapor intrusion, the Groundwater Assessment and Remediation Plans, and the Montrose DNAPL Feasibility Study might be helpful for the review or could help frame the history of EPA's interactions with stakeholders and the community. She also noted that some white powder DDT during some trenching during construction, which leads to the question whether or not the characterization is complete. Finally, she hoped that USACE would think seriously about breaking the site into all the current pieces as it pertains to cleanup and impacts to the community, how the timeframes for the remedy are not plausible, how several OUs still don't have completed Feasibility Studies, and how the characterization might not be complete yet.

Water Replenishment District of Southern California

Provided written comments on July 17th, 2015

WRDSC member 1 comments are provided unaltered below.



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July 17, 2015

Transmitted via e-mail to: Aaron.S.King@usace.army.mil

Mr. Aaron King, EIT
Environmental Engineer, Technical Services Branch
United States Army Corps of Engineers, Seattle District
PO Box 3755
Seattle, WA 98124-3755

RE: WRD Responses to the 5-Year Review Questions Regarding the Del Amo Superfund Site (OU1 and OU2) and the Dual Site Groundwater (OU3) associated with the Del Amo and Montrose Chemical Superfund Sites, Los Angeles, California

Dear Mr. King,

As the largest groundwater agency in the State of California, the Water Replenishment District of Southern California (WRD) replenishes, manages, and protects two of the most utilized urban groundwater basins in the nation, the West Coast Basin and Central Basin. Our 420-square mile service area includes approximately 4 million residents in southern Los Angeles County and encompasses 43 cities, including a portion of the City of Los Angeles. Approximately 240,000 acre-feet (78 billion gallons) of groundwater are pumped annually from these basins. As you know, both the Del Amo and Montrose Chemical Superfund Sites are located in the West Coast Basin. As a result, WRD has a strong interest in ensuring that cleanup of these sites is not only protective of human health, but also preserves the long-term quality of the groundwater resources our agency is charged with managing.

WRD appreciates the opportunity to comment on the six 5-Year Review questions regarding the Del Amo and Montrose Chemical Superfund Sites provided by the United States Army Corps of Engineers (USACE) on July 8, 2015. The USACE has set a due date for responses by no later than July 17, 2015. WRD feels that six business days to comment on these important questions is not sufficient for the preparation of in-depth technical responses and may prevent other stakeholders from commenting. Further, based on our review of the questions, we believe that the United States Environmental Protection Agency (EPA) and USACE did not fully incorporate the various technical concerns raised at previous Site-related meetings.

Below are WRD's responses to the 5-Year Review questions provided by USACE regarding the Del Amo and Montrose Chemical Superfund Sites.

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Mr. Aaron King, United States Army Corps of Engineers

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1. What are your overall impressions, comments or suggestions about the management and operation of the Site?

According to the *June 2015 Fact Sheet* issued by the EPA for the 5-Year Review for the Del Amo Superfund Site, the purpose of the 5-Year Review is to evaluate if the cleanup remedies are protective of human health and the environment. In order to meet this goal, EPA stated that they would like to answer the following three key questions:

- Is the remedy functioning as intended by the decision documents?
- Are the exposure assumptions, toxicity data, cleanup levels, and remedial action objectives used at the time of the remedy selection still valid?
- Has other information come to light that could call into question the protectiveness of the remedy?

WRD is concerned that none of these critical questions posed by the EPA were addressed by any of the 5-Year Review questions provided by USACE on July 8th. Thus, WRD feels that the subject review ultimately may be inadequate. We recommend that a supplemental set of technical-based questions be incorporated as part the 5-Year Review and that no determination regarding the status of the Sites be made prior to the USACE/EPA review of the responses to the supplemental questions. Due to the inadequacy of the initial USACE questions, WRD recommends at least one public meeting be held to gather stakeholder comments before the 5-Year Review is expected to be completed in October 2015. We understand this may delay the completion of the 5-Year Review, but feel it is necessary.

In addition, WRD has the following recommendations:

- Immediately improve communication with key stakeholders via more frequent technical updates and more transparency regarding the remediation design and implementation details,
- Implement semi-annual meetings between the key regulatory agencies, WRD, and Del Amo Action Committee, and
- Commit to timely transmittal of site-related data and documents (e.g. *Draft Monitoring and Aquifer Compliance Plan*, as-built drawings of the treatment system, groundwater modeling data, etc.) for review and comment by WRD.

2. What effects have operations at the waste pits and construction of the groundwater system had on the surrounding community?

Continued delays in implementing any reasonable remediation activities at the Sites pose an existential threat to the quality of groundwater resources within the West Coast Basin. As a public agency entrusted with protecting and preserving groundwater resources in the West Coast Basin, WRD believes remediation of the soil and groundwater at the Sites is vital and should be expedited, especially since it has been confirmed that contaminants, including chlorobenzene, have been detected as deep as the Lynwood Aquifer beneath the Site. WRD is very concerned

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about the volume/mass of contamination beneath the Sites. At the November 22, 2011, technical meeting between the EPA, California Department of Toxic Substances Control (DTSC), Los Angeles Regional Water Quality Control Board (RWQCB), and WRD, the DTSC stated that it was critical to implement mass removal in the Technical Impracticability (TI) Waiver Zone. WRD strongly agrees with DTSC's stance regarding mass removal, and also recommends that intensive groundwater monitoring by the responsible party should resume as soon as possible.

In the *Draft Feasibility Study* for the cleanup of dense non-aqueous phase liquid (DNAPL) at the Montrose Chemical Superfund Site, Montrose Chemical and their consultant proposed remedial alternatives that would require more than three millennia (3,000 years) to achieve groundwater cleanup goals. Economic concerns aside, WRD believes any proposal for a 3,000 year timeline for groundwater cleanup is entirely unacceptable. Experience at many contaminated sites has shown that the best approaches for remediation often contain a combination of remedial technologies and that within these suites of technologies, some may be multi-phased in order to more quickly neutralize all identified chemicals of concern. Simple mass reduction via excavation or large diameter augers are two such approaches.

3. Are you aware of any community concerns regarding the Site? Any regarding operations at the waste pits? Any regarding the newly build groundwater system? If so, please give details.

WRD, as a key stakeholder in the community, is highly concerned that the EPA has not reopened the *Record of Decision* (ROD) to incorporate the Public Health Protective Concentration of 3 parts per million (ppm) for para-chlorobenzenesulfonic acid (pCBSA) issued by the California Office of Environmental Health Hazard Assessment (OEHHA) in March 2015. Further, waters of the State beneath the Site, including the Upper Bellflower Aquitard (UBA), Middle Bellflower Sand (BFS), Lower Bellflower Aquitard (LBA), Gage Aquifer, and Lynwood Aquifer, are designated for beneficial use, and therefore must be protected. WRD strongly opposes the discharge of inadequately treated water or water containing remediation byproducts into the subsurface that could further degrade the water quality of these aquifers.

With regards to reinjection of treated water, WRD strongly recommends that the EPA and RWQCB adopt limits of "nondetect" for anthropogenic chemicals of concern where no scientific or regulatory criteria currently exist, which is in accordance with the *State Antidegradation Policy* (Resolution No. 68-16 adopted by the State Water Resources Control Board on October 28, 1968). The *State Antidegradation Policy* was established to maintain aquifers with the "highest water quality consistent with the maximum benefit to the people of the State" and protect the designated beneficial uses. All reinjection activities should comply with State Waste Discharge Requirements.

Additionally, WRD believes that the advancement in remedial technologies and engineering experience since 1999 when the original ROD was certified warrants another close evaluation of the TI Waiver Zone. The presence of contaminated groundwater beyond the previously mapped

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boundaries of the TI Waiver Zone clearly demonstrates that there has been transport of contamination that was not anticipated by EPA in 1999. Thus, the ROD should be reopened and the validity of the existing TI Waiver Zone be tested against current Site data. By doing so, this will fully serve the stipulated purpose of the 5-Year Review process as described in the *June 2015 Fact Sheet*.

4. Are you aware of any events, incidents, or activities at the waste pits or groundwater treatment plant such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

This seems to be a generic question and not specifically related to the status of the Sites. While WRD has not been made aware of any incidents, such as vandalism, trespassing, or emergency responses, at the waste pits or groundwater treatment plant, WRD cannot understand the importance of this question in determining the effectiveness of the cleanup remedies.

5. Do you feel well informed about the Del Amo Superfund Site's activities and progress?

No, please see response to Question 1 above.

6. Does your Agency have any technical information that may aid in our review?

Yes, WRD has tremendous experience and valuable insight that is directly relatable to the investigation, remedial design, and expedited cleanup of the Sites. WRD is the designated groundwater monitoring entity for the Central Basin and West Coast Basin under the State of California's CASGEM program (California Statewide Groundwater Elevation Monitoring). More recently, we have installed regional nested monitoring wells to support regulatory agencies in their investigation of major contaminated sites in the Central Basin. In addition, WRD manages and maintains a network of 324 nested groundwater monitoring wells at 58 locations throughout the Central Basin and West Coast Basin to depths up to 3,000 feet. The wells are measured for water levels every 6 hours using data loggers and sampled semi-annually for numerous constituents, including general minerals, volatile organic compounds, metals, general physical properties, and chemicals of emerging concern. The information generated by the regional monitoring wells is stored in WRD's Geographic Information System (GIS) and provides the basis to evaluate dynamic changes in the basins and the in-house capability to collect, analyze, and report groundwater data. An annual Regional Groundwater Monitoring Report is published by WRD, highlighting the groundwater conditions in the basins based on the monitoring activities performed over the previous year. In addition, WRD has hands-on engineering experience in the design and construction of wellhead treatment systems and treatment plants. As result we can provide technical information and insight, including aquifer specific water quality data, current and historic groundwater level data, regional hydrogeologic conditions, water cleanup technologies, and groundwater production data.

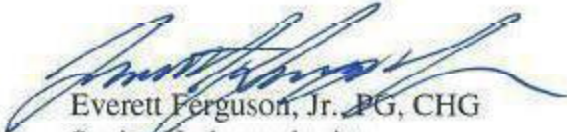
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Thank you for your consideration of our comments. If you have any questions, please contact the undersigned at 562-921-5521. We look forward to continue working with the EPA, State regulatory agencies, and Del Amo Action Committee to expedite remediation at the Del Amo and Montrose Chemical Superfund Sites.

Sincerely,



Everett Ferguson, Jr., PG, CHG
Senior Hydrogeologist



Phuong Ly, PE
Engineer

California Department of Toxic Substances Control

Provided written responses on July 31st, 2015

DTSC responses are provided unaltered below.

**Del Amo Site OU-1/OU-2 and Montrose/Del Amo Dual Site
Groundwater OU-3G
Five-Year Review by U.S. EPA and U.S. Army Corps of Engineers
Comments by the California Department of Toxic Substances Control
(DTSC)
July 31, 2015**

1) What are your overall impressions, comments or suggestions about the management and operation of the Site?

Overall, the United States Environmental Protection Agency (U.S. EPA) faces considerable challenges managing the ten complex operable units that comprise the Del Amo and Montrose Superfund Sites to achieve timely completion of all remedial activities. While remediation is complete or in progress at some operable units, progress needs to improve, as indicated further below.

Due to the fact that Operable Unit (OU)-1 and OU-2 has one U.S. EPA remedial project manager (RPM), and OU-3G has two RPMs, DTSC's impression is that in instances U.S. EPA lacked a coordinated approach in communicating with DTSC. To ensure effective staff level coordination in the future, DTSC requests U.S. EPA RPMs assigned to the ten operable units at the Del Amo and Montrose Superfund Sites hold regular coordination calls with their DTSC counterparts. In addition to ad hoc discussions to resolve periodic policy level issues, DTSC requests that U.S. EPA management hold semi-annual coordination meetings with their DTSC counterparts to review progress at these operable units and identify policy and technical issues requiring resolution by project managers, technical staff and upper level managers.

OU1/OU2

The timely implementation of the remedy specified in the Del Amo OU-1 Record of Decision (ROD) is a high priority for DTSC. The ROD was signed in 2011 and requires construction of an in-situ chemical oxidation treatment system to reduce the contaminant mass in groundwater beneath the Del Amo site. The ROD requires restrictive land use covenants to be signed with 26 property owners within the Del Amo site boundaries to protect workers and business occupants from hazardous substances. Shell Oil Company ("Shell") is responsible for implementing this remedy and for negotiating the land use covenants on behalf of the state and U.S.EPA. Since the ROD was signed, U.S. EPA, the United States Department of Justice, the California Attorney General's Office, and Shell have been negotiating a consent decree to implement the remedy. It is important that the negotiations be brought to a timely conclusion so that the in-situ treatment remedy can be constructed and land use covenants executed to protect human health and drinking water aquifers. DTSC acknowledges that U.S. EPA is continuing to work diligently with Shell to resolve remaining issues and to get the consent decree completed.

OU-3G

The amount of time it has taken to implement the remedy for the OU-3G ROD is of concern to DTSC. The ROD was signed in 1999 and construction of the groundwater treatment system was not completed until December 2014. The start-up of the system awaits completion of functional tests. Early tests indicate that the system is encountering challenges to meeting the ROD's operation and treatment standards. The state is concerned that the treatment standard of 25 parts per million (ppm) for para-chlorobenzene sulfonic acid ("pCBSA") may not be protective of human health. The California Office of Environmental Health Hazard Assessment ("OEHHA") evaluated the health effects of this substance and in March 2015 issued the document "Public Health Protective Concentration for para-Chlorobenzene Sulfonic Acid." OEHHA identified a public health concentration of three (3) milligrams per liter (mg/L or ppm) for pCBSA in drinking water, which is almost ten times lower than the 25 ppm treatment standard required in the 1999 ROD. DTSC acknowledges that more studies are required to understand the effects of this substance on humans and the environment. Also, a Monitoring and Aquifer Compliance Plan (MACP) has not been finalized for the treatment system. The MACP will specify the methods and protocols to monitor the long term operational performance of the treatment system.

Further delays in implementing the OU-3G remedy will make it costlier and more difficult to achieve the ROD's protectiveness goals. It is important that the system begin operations in a timely manner, employ standards that reflect the latest science, and have effective protocols to monitor the system throughout its operational performance.

2) What effects have operations at the waste pits and construction of the groundwater system had on the surrounding community?

OU1/OU2

DTSC is not aware of any adverse effects on the surrounding community caused by operation of the Del Amo waste pits (OU-1/OU-2) remedy. The Soil Vapor Extraction/In-Situ Bioventing system is operating in accordance with the ROD. The newly installed extraction system is operating, and data indicates the plume is stable. DTSC has not observed any immediate adverse effects from the waste pits on the surrounding community.

OU-3G

OU-3G's groundwater treatment system was completed in December 2014. Currently, the start-up and commissioning of the groundwater treatment system is delayed due to problems with the equipment and components (See Response No. 1 above.). Due to the fact Montrose Chemical Corporation of California ("Montrose") is currently unable to successfully start the system, the groundwater contaminant plumes consisting of benzene, monochlorobenzene ("MCB"), pCBSA, and trichloroethylene ("TCE"), continue to spread into and under the surrounding community, down-gradient of the Montrose and Del Amo Superfund sites.

3) Are you aware of any community concerns regarding the Site? Any regarding operations at the waste pits? Any regarding the newly build groundwater system? If so, please give details.

DTSC is aware of community concerns raised by the Del Amo Action Committee (DAAC). The community near OU-1/OU-2 and OU-3G has concerns about the construction and operation of the groundwater treatment system at OU-3G. Among other things, the community believes that Montrose should not have taken a decade to construct the groundwater treatment system, the system does not appear to meet its design criteria, and it may not operate properly due to faulty equipment and components. The community is concerned that the groundwater contaminant plume of MCB, TCE, and benzene will continue to spread into and under its neighborhood as long as the groundwater treatment system remains inoperative and/or does not meet specifications. The community also believes that the treatment standard specified in the ROD for pCBA is likely not protective of human health and that the current design of the groundwater treatment system does not sufficiently remediate this substance.

On May 4, 2015, U.S.EPA conducted a Five-Year Review meeting for the Del Amo Superfund Site's (OU1/OU2) and the Montrose/Del Amo Dual Site Groundwater unit (OU-3G) to seek input from DAAC. Based on U.S.EPA notes from this meeting, the community expressed the following concerns:

- a) How are disagreements on the draft Five-Year Review between Army Corps of Engineers (ACE) and U.S. EPA handled, is the Five-Year review process a public process, and how is it documented?
- b) Why was ACE determined to be the sole source contractor for preparing the Draft Five-Year Review report and why was another entity not considered to do the evaluation?
- c) How will institutional controls for OU1/OU2 be implemented?
- d) How are renters and home buyers informed about the Superfund sites?
- e) What is U.S. EPA's role versus the state, city, county?
- f) Are there deed restrictions for residential properties (particularly homes over the groundwater plume)?
- g) U.S. EPA is not sharing the monthly monitoring reports from Shell with the community.
- h) The community was not allowed to participate when decisions on Non-Aqueous Phase Liquid ("NAPL") were made.
- i) How will U.S.EPA revisit the remedy in general and during the Five-Year Review and how will U.S.EPA determine whether the remedy is efficient?

- j) Has pCBSA impacted drinking water and will the groundwater treatment system treat pCBSA- impacted groundwater, prior to re-injecting the treated groundwater into the Gage aquifer?
- k) If a component of the remedy is not implemented, how will the Five-Year Review evaluate it?
- l) Is the International Light Metals site a new source of contamination since development of the ROD ?
- m) Will U.S.EPA revisit the decision to leave waste in place forever?
- n) Will U.S.EPA revisit assumptions in groundwater modeling that are now known to be wrong?
- o) Will the Five-Year Review address inadequate groundwater monitoring?
- p) Will U.S.EPA allow community representatives to speak with ACE to voice concerns and ask questions?
- q) Is vapor intrusion occurring in homes via the groundwater pathway?
- r) Is vapor intrusion occurring in homes via the vadose zone pathway?

4) Are you aware of any events, incidents, or activities at the waste pits or groundwater treatment plant such as vandalism, trespassing, or emergency responses from local authorities? If so, please give details.

DTSC is not aware of any events, incidents, or activities (such as vandalism, trespassing, or emergency responses from local authorities) at OU1/OU2 and OU3-G.

5) Do you feel well informed about the Del Amo Superfund Site's activities and progress?

DTSC believes it is more informed than in the recent past. DTSC appreciates U.S. EPA's outreach to state regulatory agencies, stakeholders, and the community for input into this Five-Year Review. This endeavor builds upon the outreach effort U.S. EPA began when the OU-3G groundwater treatment system was completed in December 2014. It is important that U.S. EPA continue to communicate and coordinate with state agencies and stakeholders to ensure their concerns are brought forth and considered in U. S. EPA's actions. As lead state agency for National Priorities List sites, DTSC must be provided with adequate time to review technical and decisional documents and sufficient notice of meetings and conference calls requested by U.S. EPA. Also, U.S. EPA should respond to DTSC's comments and concerns raised in meetings and correspondence. Finally, when requesting DTSC's input, U.S. EPA should provide DTSC with sufficient time to consult with sister agencies, including the Los Angeles Regional Water Quality Control Board, public entities, and community and stakeholder groups with an interest in the Del Amo and Montrose sites.

6) Does your Agency have any technical information that may aid in our review?

DTSC provides its technical information, opinions, and expertise about OU1/OU2 and OU-3G to U.S.EPA on an ongoing basis. Regarding OU1/OU2, DTSC's most current technical information/comments are as follows:

Shell has only relied on Monitored Natural Attenuation (MNA) to remediate benzene contamination in groundwater. However, there is excessive Light Non-Aqueous Phase Liquid ("LNAPL") at several distinct locations at the Del Amo Superfund Site. The dissolved benzene mass remains in the technical impracticability ("TI") zone and will require remediation to prevent the contamination from spreading outside the TI waiver zone. U.S.EPA should require Shell to address how the benzene mass will be reduced at both the source and groundwater plume areas.

Regarding OU-3G, DTSC's most recent technical information/comments are as follows:

a) Shell proposed intrinsic biodegradation (under natural conditions) as a remedy, to treat the benzene plume at OU1/OU2, therefore it pertains to OU-3G. However, DTSC is not aware of any data supporting MNA. More MNA data is needed (i.e. dissolved oxygen, nitrate, sulfate, methane, ORP etc.) including biodegradation organism counts to demonstrate that biological activity inside the dissolved benzene plume is occurring. Additionally, based on 2006 groundwater data, it appears that vertical benzene migration to the Gage aquifer is occurring (up to 500 ug/l at well SWL0063, as listed in the link of http://delamoactioncommittee.org/DEL_OU1_AR_2010/2178781.pdf). Consequently, MNA may not stop the downward migration to underlying aquifers.

b) OU-3G does not have a well-developed and comprehensive Conceptual Area Model that identifies other groundwater contaminant plumes in the area, including which parties are responsible for which plumes, and how the various groundwater systems interact with each other. DTSC views such a model as integral to successful remediation at the OU-3G Site.

c) The current groundwater model developed by Montrose and approved by U.S.EPA predicts a 35% reduction of the MCB plume (outside TI waiver zone/Gage Aquifer) in five years and 100% reduction of the MCB plume in 50 years (after initial start-up of the groundwater treatment system). In order for DTSC to concur with this prediction of plume reduction, MACP data must be provided to support the prediction. Currently, without MACP data, DTSC can only consider the results to be speculative. At this time, the model's prediction may only be used as a reference point pending for verification from field data. Past simulation results at the Del Amo Site failed to indicate that benzene contamination will migrate to Gage aquifer at concentrations up to 500 ug/l.

d) The current groundwater model does not appear to have been adequately calibrated to show other contaminant plumes in the general area, or the interaction of groundwater treatment systems (i.e. at the Exxon Mobile Refinery; or the former Boeing site). The current groundwater model should be recalibrated with 1) the most recent contaminant concentration data, 2) the actual extraction well locations, including the anticipated pumping rates for each

well, and 3) possibly the two new drinking water wells installed by the City of Torrance (upgradient from the proposed groundwater extraction capture zone).

e) The MACP for OU-3G is not complete. The integration of the Del Amo MACP into Montrose's MACP for OU-3G into a joint document has not occurred. Once those MACPs are combined, U.S. EPA and DTSC will still need to evaluate groundwater data gaps for OU/1, OU/2 and OU-3G.

f) DTSC is concerned that there are many contaminated sites near OU-3G, and releases from those sites may influence the groundwater to be treated by, and the operation of, the OU-3G treatment system. The nearby sites include the Jones Chemical site and other sites in the proximity of OU-3G where approximately 60 businesses have operated. DTSC acknowledges that the Jones Chemical site is an operable unit under U.S. EPA's purview. DTSC recommends that U.S. EPA collect data about these sites, provide it to interested parties, and include the data in U.S. EPA's groundwater model. U.S. EPA should require Jones Chemical to investigate and address its groundwater contaminant plume, because the OU-3G and Jones Chemical plumes are co-mingled, and the Jones Chemical plume is contributing to the spreading of the OU-3G plume.

g) Montrose should clarify the effects of Dense Non-Aqueous Phase Liquid ("DNAPL") source removal vs. groundwater treatment of the MCB plume at OU-3G. Montrose should clearly demonstrate how it intends to ensure that no significant DNAPL or dissolved mass will migrate from the TI containment zone, and impact the groundwater treatment system. U.S. EPA should specify what actions Montrose must take if the DNAPL mass spreads outside of the containment zone at OU-3G. U.S. EPA should require Montrose to develop a contingency plan that addresses such potential migration.

h) Injection wells may push or displace the existing plumes at the OU-3G Site to unanticipated areas. U.S. EPA should require Montrose to study the injection trajectory, to ensure that the plumes at each hydrostratigraphic unit within the OU-3G Site will not displace or spread further. Additionally, several injection wells have been relocated around OU-3G due to access agreement issues with property owners. Montrose should confirm that its existing groundwater model reflects the relocated injection wells.

i) At OU-3G, U.S. EPA should require Montrose to confirm whether the DNAPL source mass can be removed. If Montrose cannot confirm this, then U.S. EPA should require Montrose to provide designs that address DNAPL and groundwater remediation in such a way that the mass will be contained and/or removed. The current groundwater model prepared by Montrose and approved by U.S. EPA assumes the DNAPL mass at source zone will not spread away from the containment zone. U.S. EPA should require Montrose to demonstrate that this assumption is accurate. If it is not, then U.S. EPA should require Montrose take whatever actions are necessary, including revising the projected initial and boundary, so that a reliable model is produced.

j) Currently, U.S. EPA is finalizing the Proposed DNAPL Cleanup Plan to address DNAPL residing in soil and groundwater beneath OU-3D. U.S. EPA selected Electrical Resistance Heating (ERH) treatment for a focused area at OU-3D. ERH consists of installing electrodes

throughout the treatment zone and transmitting an electric current between them to heat the soil by electrical resistance. The ERH process would remove chlorobenzene from the DNAPL by vaporizing it. The vapors generated by this process would then be recovered by SVE wells for above-ground vapor treatment. DNAPL source removal contemplated in U.S.EPA's proposed plan assumes the DNAPL mass only exists in the B-Sand and not in deeper zones. This assumption is not supported by C-sand dissolved groundwater data and must be subject to field verification. If the DNAPL mass exists in the deeper parts of the C-zone or below, it will introduce additional contaminant mass to groundwater that the current model prediction will not capture. This additional mass could migrate beyond the TI containment zone and have to be treated by the OU-3G groundwater treatment system.

k) Based on start-up testing data and information, the pCBSA influent concentrations exceed ROD design parameters and therefore Montrose has proposed changing the pumping scheme. In addition, the anti-degradation analysis based on the State Water Board's Anti-Degradation Policy may restrict or influence the proposed injection of pCBSA. If the antidegradation analysis results in modifications to the injection concentrations, then U.S. EPA should reevaluate any changes to injection parameters.

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Appendix E: Site Inspection Documents

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I. SITE INFORMATION															
Site name: Del Amo Superfund Site - Waste Pits OU		Date of inspection: 14 November 2014													
Location: Los Angeles, CA - Region IX		EPA ID: CAD029544731													
Agency, office, or company leading the five-year review: U.S. EPA, Region IX		Weather/temperature: Partly Cloudy, Upper 60s F													
Remedy Includes: (Check all that apply) <table border="0"><tr><td><input checked="" type="checkbox"/> Landfill cover/containment</td><td><input type="checkbox"/> Monitored natural attenuation</td></tr><tr><td><input checked="" type="checkbox"/> Access controls</td><td><input type="checkbox"/> Groundwater containment</td></tr><tr><td><input checked="" type="checkbox"/> Institutional controls</td><td><input type="checkbox"/> Vertical barrier walls</td></tr><tr><td><input type="checkbox"/> Groundwater pump and treatment</td><td></td></tr><tr><td><input type="checkbox"/> Surface water collection and treatment</td><td></td></tr><tr><td><input checked="" type="checkbox"/> Other: <i>e.g. Groundwater monitoring</i></td><td></td></tr></table> <p>SVE/IBT System, Cap-Gas Collection, & Treatment System. Surface water collection.</p>				<input checked="" type="checkbox"/> Landfill cover/containment	<input type="checkbox"/> Monitored natural attenuation	<input checked="" type="checkbox"/> Access controls	<input type="checkbox"/> Groundwater containment	<input checked="" type="checkbox"/> Institutional controls	<input type="checkbox"/> Vertical barrier walls	<input type="checkbox"/> Groundwater pump and treatment		<input type="checkbox"/> Surface water collection and treatment		<input checked="" type="checkbox"/> Other: <i>e.g. Groundwater monitoring</i>	
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<input type="checkbox"/> Surface water collection and treatment															
<input checked="" type="checkbox"/> Other: <i>e.g. Groundwater monitoring</i>															
Attachments: <input checked="" type="checkbox"/> Inspection team roster attached <input checked="" type="checkbox"/> Site map attached															
II. INTERVIEWS (Check all that apply)															
1. O&M site manager William White C2 REM, Project Manager 14 Nov. 2014															
Name Title Date															
Interviewed <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____															
Problems, suggestions; <input checked="" type="checkbox"/> Report attached _____															
2. O&M staff Seamus McGeough _____															
Name Title Date															
Interviewed <input checked="" type="checkbox"/> at site <input type="checkbox"/> at office <input type="checkbox"/> by phone Phone no. _____															
Problems, suggestions; <input checked="" type="checkbox"/> Report attached _____															

- | | | | |
|--|-------|-------|-----------|
| Agency _____
Contact _____ | _____ | _____ | _____ |
| Name | Title | Date | Phone no. |
| Problems; suggestions; <input checked="" type="checkbox"/> Report attached | _____ | | |
| | | | |
| Agency _____
Contact _____ | _____ | _____ | _____ |
| Name | Title | Date | Phone no. |
| Problems; suggestions; <input checked="" type="checkbox"/> Report attached | _____ | | |
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| Agency _____
Contact _____ | _____ | _____ | _____ |
| Name | Title | Date | Phone no. |
| Problems; suggestions; <input type="checkbox"/> Report attached | _____ | | |
| | | | |
| Agency _____
Contact _____ | _____ | _____ | _____ |
| Name | Title | Date | Phone no. |
| Problems; suggestions; <input type="checkbox"/> Report attached | _____ | | |

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4. [Download the PDF](#)

- | | | | | |
|----|---|---|--|------------------------------|
| 2. | Site-Specific Health and Safety Plan | <input checked="" type="checkbox"/> Readily available | <input checked="" type="checkbox"/> Up to date | <input type="checkbox"/> N/A |
| | <input type="checkbox"/> Contingency plan/emergency response plan | <input type="checkbox"/> Readily available | <input type="checkbox"/> Up to date | <input type="checkbox"/> N/A |
| | Remarks The HASP was revised August 2014. | | | |

3.	O&M and OSHA Training Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	Remarks O&M and OSHA Training Records are kept and maintained at C2 REM's Newport Beach office. It was undetermined at the time of inspection whether the records are up to date.
4.	Permits and Service Agreements <input type="checkbox"/> Air discharge permit <input type="checkbox"/> Effluent discharge <input type="checkbox"/> Waste disposal, POTW <input type="checkbox"/> Other permits _____	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> N/A	Remarks Operation of the SVE/IBT system does not require a permit with the SCAQMD because of Superfund classification. Respondents are only required to "meet the intent" of the permit requirements. Consequently, no data are reported to SCAQMD. Surface water collected through the cap drainage is discharged directed to the municipal stormwater sewer system. No permit required.
5.	Gas Generation Records	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input type="checkbox"/> N/A	Remarks SVE/IBT system began full-operation on August 7, 2006. Data is presented in the annual OM&M Reports. All gas generation data for the previous five years will be found in the annual report.
6.	Settlement Monument Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A	Remarks Settlement data are recorded every five years. Settlement data from the 2010 are presented in the OM&M report. Data from the March 2015 settlement survey could be made available when completed and reviewed by C2 REM. These data are kept at the C2 REM Newport Beach Office.
7.	Groundwater Monitoring Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A	Remarks C2 REM indicated that groundwater monitoring data were being collected. The most recently collected groundwater data is dated September 2014 but has not been reported yet.
8.	Leachate Extraction Records	<input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date	<input type="checkbox"/> N/A	Remarks
9.	Discharge Compliance Records <input type="checkbox"/> Air <input type="checkbox"/> Water (effluent)	<input type="checkbox"/> Readily available <input type="checkbox"/> Readily available	<input type="checkbox"/> Up to date <input type="checkbox"/> Up to date	<input type="checkbox"/> N/A <input type="checkbox"/> N/A	Remarks Benzene concentrations are monitored at the effluent of 1) the Cap-Gas Collection and Treatment System, and 2) the SVE/IBT System. Monitoring is conducted bi-weekly for both. The monitoring data are presented in the annual OM&M reports. Condensate (approx. 25gal/year) collected primarily from the SVE/IBT system low points (less than 30gal/year from air-water separator of the SVE/IBT System) is manifested and disposed of as hazardous material.
10.	Daily Access/Security Logs	<input checked="" type="checkbox"/> Readily available	<input checked="" type="checkbox"/> Up to date	<input checked="" type="checkbox"/> N/A	Remarks Site visit logs are recorded during C2 REM's inspections. Complete logs are kept at the C2 REM Newport Beach Office.

IV. O&M COSTS

1. **O&M Organization**

- | | |
|--|--|
| <input type="checkbox"/> State in-house | <input type="checkbox"/> Contractor for State |
| <input type="checkbox"/> PRP in-house | <input checked="" type="checkbox"/> Contractor for PRP |
| <input type="checkbox"/> Federal Facility in-house | <input type="checkbox"/> Contractor for Federal Facility |
| <input type="checkbox"/> Other | |

2. **O&M Cost Records**

- ☐ Readily available ☐ Up to date ☐ Funding mechanism/agreement in place
 Original O&M cost estimate _____ ☐ Breakdown attached

Total annual cost by year for review period if available

From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	
From _____	To _____	_____	<input type="checkbox"/> Breakdown attached
Date	Date	Total cost	

3. **Unanticipated or Unusually High O&M Costs During Review Period**

Describe costs and reasons:

During the previous five years, Performance Monitoring Events (PME) occurred on site. Due to these PMEs the cost of O&M during the review period are lower than normally anticipated; however if the cost of the PMEs are included in the O&M then it is expected to be greater than normally anticipated.

V. ACCESS AND INSTITUTIONAL CONTROLS ☒ Applicable ☒ N/A

A. Fencing

1. **Fencing damaged** ☐ Location shown on site map ☐ Gates secured ☐ N/A

Remarks A 6-ft high chain-link fence is installed around the perimeter of the site. A 10-ft high security fence with barbed wire and vinyl slats is installed around the SVE/IBT treatment enclosure. Both fences appeared to be in good condition and are routinely inspected.

B. Other Access Restrictions

1. **Signs and other security measures** ☒ Location shown on site map ☒ N/A

Remarks Signs are present at the site gate and on the fences surrounding the site.

C. Institutional Controls (ICs)

1. Implementation and enforcement

Site conditions imply ICs not properly implemented

☐ Yes ☒ No ☐ N/A

Site conditions imply ICs not being fully enforced

☐ Yes ☒ No ☐ N/A

Type of monitoring (e.g., self-reporting, drive by) Visual monitoring is conducted as part of routine O&M.

Frequency At-least twice monthly, more frequently if necessary for system operation or maintenance.

Responsible party/agency C2 REM

Contact William White

C2 REM Project Manager

14 Nov 2014

(949) 261 - 8098

Name

Title

Date Phone no.

Reporting is up-to-date

☐ Yes ☐ No ☒ N/A

Reports are verified by the lead agency

☐ Yes ☐ No ☒ N/A

Specific requirements in deed or decision documents have been met

☒ Yes ☐ No ☐ N/A

Violations have been reported

☐ Yes ☐ No ☒ N/A

Other problems or suggestions: ☐ Report attached

2. Adequacy

☒ ICs are adequate

☐ ICs are inadequate

☐ N/A

Remarks Deed restrictions apply to the capped portion of the site. The deed restrictions prohibit specific uses for the property (i.e. residential, hospital, school, daycare) and also prohibits disturbance and non-interference with the cap and SVE system.

D. General

1. Vandalism/trespassing

☐ Location shown on site map

☐ No vandalism evident

Remarks Vandalism and trespassing have been an ongoing issue at the site. C2 REM recently upgraded the security system (which included motion sensor lighting, motion sensor security cameras, and alarm system). Incidents of vandalism & trespassing are reported to the local police.

2. Land use changes on site ☒ N/A

Remarks

3. Land use changes off site ☒ N/A

Remarks

VI. GENERAL SITE CONDITIONS

A. Roads

☒ Applicable

☐ N/A

1. Roads damaged

☐ Location shown on site map

☐ Roads adequate

☐ N/A

Remarks A rock/gravel based access road is present along the northern side of the site. The road extends from Vermont Ave. to the trailer and treatment pad enclosure.

B. Other Site Conditions

Remarks

A native blend of grass is maintained on the cap. However, due to current drought conditions in California and the on-site field activities, the grass has been allowed to naturally die off. C2 REM believes the vegetation can be easily regrown if/when conditions allow.

VII. LANDFILL COVERS ☐ Applicable ☐ N/A**A. Landfill Surface**

1. **Settlement** (Low spots) ☒ Location shown on site map ☐ Settlement not evident
Areal extent _____ Depth _____
Remarks Settlement monitoring is conducted every five years, with the most recent event conducted in March 2010. One area within Sub-Area II demonstrated signs of burrowing animals. The next settlement monitoring event is anticipated to occur in 2015.

2. **Cracks** ☐ Location shown on site map ☒ Cracking not evident
Lengths _____ Widths _____ Depths _____
Remarks

3. **Erosion** ☐ Location shown on site map ☒ Erosion not evident
Areal extent _____ Depth _____
Remarks

4. **Holes** ☐ Location shown on site map ☒ Holes not evident
Areal extent _____ Depth _____
Remarks

5. **Vegetative Cover** ☒ Grass ☐ Cover properly established
☐ No signs of stress ☐ Trees/Shrubs (indicate size and locations on a diagram)
Remarks Signs of vegetation stress was evident during the inspection, due to current California drought and recent on-site field activities. C2 REM indicated that watering is necessary for the portions not stressed by the field activities.

6. **Alternative Cover (armored rock, concrete, etc.)** ☒ N/A
Remarks

7. **Bulges** ☐ Location shown on site map ☒ Bulges not evident
Areal extent _____ Height _____
Remarks

8.	Wet Areas/Water Damage <input type="checkbox"/> Wet areas <input type="checkbox"/> Ponding <input type="checkbox"/> Seeps <input type="checkbox"/> Soft subgrade Remarks _____	<input checked="" type="checkbox"/> Wet areas/water damage not evident <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Location shown on site map Areal extent _____ <input type="checkbox"/> Location shown on site map Areal extent _____
9.	Slope Instability <input type="checkbox"/> Slides <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks _____	<input checked="" type="checkbox"/> No evidence of slope instability
B. Benches <input checked="" type="checkbox"/> N/A <input type="checkbox"/> Applicable (Horizontally constructed mounds of earth placed across a steep landfill side slope to interrupt the slope in order to slow down the velocity of surface runoff and intercept and convey the runoff to a lined channel.)		
1.	Flows Bypass Bench Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A or okay
2.	Bench Breached Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A or okay
3.	Bench Overtopped Remarks _____	<input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A or okay
C. Letdown Channels <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A (Channel lined with erosion control mats, riprap, grout bags, or gabions that descend down the steep side slope of the cover and will allow the runoff water collected by the benches to move off of the landfill cover without creating erosion gullies.)		
1.	Settlement <input type="checkbox"/> Location shown on site map Areal extent _____ Depth _____ Remarks _____	<input checked="" type="checkbox"/> No evidence of settlement
2.	Material Degradation <input type="checkbox"/> Location shown on site map Material type _____ Areal extent _____ Remarks _____	<input checked="" type="checkbox"/> No evidence of degradation
3.	Erosion <input type="checkbox"/> Location shown on site map Areal extent _____ Depth _____ Remarks _____	<input checked="" type="checkbox"/> No evidence of erosion

4.	Undercutting Areal extent _____ Remarks _____	<input type="checkbox"/> Location shown on site map Depth _____	<input checked="" type="checkbox"/> No evidence of undercutting
5.	Obstructions Type _____ Areal extent _____ Size _____ Remarks _____	<input checked="" type="checkbox"/> No obstructions	<input type="checkbox"/> Location shown on site map
6.	Excessive Vegetative Growth Type _____ <input checked="" type="checkbox"/> No evidence of excessive growth <input type="checkbox"/> Vegetation in channels does not obstruct flow <input type="checkbox"/> Location shown on site map Areal extent _____ Remarks Grass is mowed when necessary.		
D. Cover Penetrations <input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A			
1.	Gas Vents <input type="checkbox"/> N/A <input checked="" type="checkbox"/> Active <input type="checkbox"/> Passive <input checked="" type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration Remarks Wells associated with the SVE/IBT system are present within the surface area of the cap. Wells appear to be either abandoned or in good condition. New conveyance and manifold piping to blower and carbon units are being installed. SVE/IBT system was currently offline, but previously operated 8hrs/day 5days/week. Cap gas collected in sand layer is conveyed to treatment via piping connected to the system blower. Blower to collect cap gas typically operated 4hrs/day 5days/week.		
2.	Gas Monitoring Probes <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A Remarks _____		
3.	Monitoring Wells (within surface area of landfill) <input type="checkbox"/> Properly secured/locked <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks Wells appeared to be in good condition. Wells, consisting of vapor monitoring and groundwater monitoring wells, are located within the footprint of the cap.		
4.	Leachate Extraction Wells <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> Evidence of leakage at penetration <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A Remarks _____		
5.	Settlement Monuments <input checked="" type="checkbox"/> Located <input checked="" type="checkbox"/> Routinely surveyed <input type="checkbox"/> N/A Remarks Approximately 8-9 settlement monitoring points exist on the cap. The latest survey was reportedly completed in March 2010 with the next survey scheduled for 2015.		

E. Gas Collection and Treatment		<input checked="" type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Gas Treatment Facilities <input type="checkbox"/> Flaring <input type="checkbox"/> Thermal destruction <input type="checkbox"/> Collection for reuse <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks Gas beneath the cap is collected in a 60-inch sand layer located on top of the cap foundation, then conveyed through 4-inch piping (perforated below grade), extending to an above-ground blower located at the treatment enclosure. Gas treatment consists of vapor-liquid separator and two carbon canisters operated in series.		
2.	Gas Collection Wells, Manifolds and Piping <input checked="" type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks New subsurface piping and manifold is under construction and is anticipated to be completed in December 2014.		
3.	Gas Monitoring Facilities (<i>e.g.</i> , gas monitoring of adjacent homes or buildings) <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A Remarks		
F. Cover Drainage Layer		<input type="checkbox"/> Applicable	<input type="checkbox"/> N/A
1.	Outlet Pipes Inspected <input checked="" type="checkbox"/> Functioning <input type="checkbox"/> N/A Remarks Concrete lined V-ditches are located on the northern and southern edges of the cap. The ditches lead to two catch basins located on the eastern end of the cap. Collected surface runoff is disposed to the municipal sewer system.		
2.	Outlet Rock Inspected <input type="checkbox"/> Functioning <input checked="" type="checkbox"/> N/A Remarks		
G. Detention/Sedimentation Ponds		<input type="checkbox"/> Applicable	<input checked="" type="checkbox"/> N/A
1.	Siltation <input type="checkbox"/> N/A <input type="checkbox"/> Siltation not evident Areal extent _____ Depth _____ Remarks		
2.	Erosion Areal extent _____ Depth _____ <input type="checkbox"/> Erosion not evident Remarks		
3.	Outlet Works <input type="checkbox"/> Functioning <input checked="" type="checkbox"/> N/A Remarks		
4.	Dam <input type="checkbox"/> Functioning <input checked="" type="checkbox"/> N/A Remarks		

H. Retaining Walls		<input checked="" type="checkbox"/> Applicable <input type="checkbox"/> N/A
1.	Deformations <input checked="" type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Deformation not evident Horizontal displacement _____ Vertical displacement _____ Rotational displacement _____ Remarks Rock-based gabion walls are present along the southern edge of the cap and constructed as part of the original installation. Gabion wall is in good condition.	
2.	Degradation <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Degradation not evident Remarks	
I. Perimeter Ditches/Off-Site Discharge		<input checked="" type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A
1.	Siltation <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Siltation not evident Areal extent _____ Depth _____ Remarks Ditches are routinely inspected for vegetation, caulking, siltation, etc. No siltation observed during inspection. Landscaping sub-contractor is responsible for clearing ditches.	
2.	Vegetative Growth <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> N/A <input checked="" type="checkbox"/> Vegetation does not impede flow Areal extent _____ Type _____ Remarks	
3.	Erosion <input type="checkbox"/> Location shown on site map <input checked="" type="checkbox"/> Erosion not evident Areal extent _____ Depth _____ Remarks	
4.	Discharge Structure <input checked="" type="checkbox"/> Functioning <input checked="" type="checkbox"/> N/A Remarks	
VIII. VERTICAL BARRIER WALLS		<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A
1.	Settlement <input type="checkbox"/> Location shown on site map <input type="checkbox"/> Settlement not evident Areal extent _____ Depth _____ Remarks	
2.	Performance Monitoring Type of monitoring _____ <input type="checkbox"/> Performance not monitored <input type="checkbox"/> Evidence of breaching Frequency _____ Head differential _____ Remarks	
IX. GROUNDWATER/SURFACE WATER REMEDIES		<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A
A. Groundwater Extraction Wells, Pumps, and Pipelines		<input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A
1.	Pumps, Wellhead Plumbing, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells properly operating <input type="checkbox"/> Needs Maintenance <input checked="" type="checkbox"/> N/A Remarks	

2.		Extraction System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks	
3.		Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks	
B. Surface Water Collection Structures, Pumps, and Pipelines <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.		Collection Structures, Pumps, and Electrical <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks	
2.		Surface Water Collection System Pipelines, Valves, Valve Boxes, and Other Appurtenances <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks	
3.		Spare Parts and Equipment <input type="checkbox"/> Readily available <input type="checkbox"/> Good condition <input type="checkbox"/> Requires upgrade <input type="checkbox"/> Needs to be provided Remarks	
C. Treatment System <input type="checkbox"/> Applicable <input checked="" type="checkbox"/> N/A			
1.		Treatment Train (Check components that apply) <div style="display: flex; justify-content: space-between;"> <div> <input type="checkbox"/> Metals removal <input type="checkbox"/> Air stripping <input type="checkbox"/> Filters <input type="checkbox"/> Additive (<i>e.g.</i>, chelation agent, flocculent) <input type="checkbox"/> Others </div> <div> <input type="checkbox"/> Oil/water separation <input type="checkbox"/> Carbon adsorbers </div> <div> <input type="checkbox"/> Bioremediation </div> </div> <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> Sampling ports properly marked and functional <input type="checkbox"/> Sampling/maintenance log displayed and up to date <input type="checkbox"/> Equipment properly identified <input type="checkbox"/> Quantity of groundwater treated annually _____ <input type="checkbox"/> Quantity of surface water treated annually _____ Remarks	
2.		Electrical Enclosures and Panels (properly rated and functional) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks	

3.	Tanks, Vaults, Storage Vessels <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Proper secondary containment <input type="checkbox"/> Needs Maintenance Remarks
4.	Discharge Structure and Appurtenances <input type="checkbox"/> N/A <input type="checkbox"/> Good condition <input type="checkbox"/> Needs Maintenance Remarks
5.	Treatment Building(s) <input type="checkbox"/> N/A <input type="checkbox"/> Good condition (esp. roof and doorways) <input type="checkbox"/> Needs repair <input type="checkbox"/> Chemicals and equipment properly stored Remarks
6.	Monitoring Wells (pump and treatment remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks
D. Monitoring Data	
1.	Monitoring Data <input type="checkbox"/> Is routinely submitted on time <input type="checkbox"/> Is of acceptable quality
2.	Monitoring data suggests: <input type="checkbox"/> Groundwater plume is effectively contained <input type="checkbox"/> Contaminant concentrations are declining
D. Monitored Natural Attenuation	
1.	Monitoring Wells (natural attenuation remedy) <input type="checkbox"/> Properly secured/locked <input type="checkbox"/> Functioning <input type="checkbox"/> Routinely sampled <input type="checkbox"/> Good condition <input type="checkbox"/> All required wells located <input type="checkbox"/> Needs Maintenance <input type="checkbox"/> N/A Remarks
X. OTHER REMEDIES	
If there are remedies applied at the site which are not covered above, attach an inspection sheet describing the physical nature and condition of any facility associated with the remedy. An example would be soil vapor extraction.	

XI. OVERALL OBSERVATIONS

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.).

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of O&M or a high frequency of unscheduled repairs, that suggest that the protectiveness of the remedy may be compromised in the future.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

X. Other Remedies:**SVE/IBT System****A. SVE Extraction Wells, Pumps, and Pipelines**1. Pumps, wellhead pumping, and electrical

(X) Good condition

() Needs maintenance

(X) All required wells are properly operating

() N/A

Remarks: Well heads appear to be in good condition. Current field activities involve installing new wells. Injection well heads will be enclosed in locked metal cages to prevent tampering. Piping to well heads is/will be buried.

2. Extraction System Pipelines, Valves, Valve boxes, and Other appurtenances

(X) Good condition

() Needs maintenance

Remarks: Existing (and non-dismantled) above-ground extraction system piping appears to be in good condition. Additional pipe tie-ins will be installed with new manifold following the completion of current field activities. Visual inspection of well vault surfaces did not reveal any damage or deficiencies.

3. Spare parts and equipment

(X) Readily available

() Good condition

() Requires upgrade

() Needs to be provided

Remarks: Spare parts and other equipment are kept in an on-site storage container.

B. Surface water collection structures, pumps, and pipelines1. Collection structures, pumps, and electrical

() Good condition

() Needs maintenance

Remarks: No secondary containment for air-water separator. C2 REM indicated that approximately 10-30 gallons per year is collected from the air-water separator for the SVE/IBT system. Negligible amount of water collected annually in the vapor-liquid separator for the cap gas treatment system.

2. Surface water collection system pipelines, valves, valve boxes, and other appurtenances

() Good condition

() Needs maintenance

(X) N/A

3. Spare parts and equipment

(X) Readily available

() Good condition

() Requires upgrade

() Needs to be provided

Remarks: Spare parts and other equipment are kept in an on-site storage container.

C. Treatment System

(X) Applicable

() N/A

1. Treatment Train (Check components that apply)

() Metals Removal

() Oil/Water Separators

- ☒ Bioremediation
☒ Carbon Adsorbers
☐ Filters:
☐ Additive (*e.g.* chelation agent, flocculant):
☒ Others: O₂ generation
☒ Good condition ☐ Needs maintenance
☐ Sampling ports properly marked and functional
☐ Sampling/Maintenance log displayed and up to date
☒ Equipment properly identified
☐ Quantity of groundwater treated annually:
☐ Quantity of surface water treated annually:

Remarks: During the time of inspection the SVE/IBT system was not running. The tie-in pipelines and manifold were dismantled and many of the wells were abandoned. Prior to dismantling the SVE/IBT system consisted of 13 well-heads in sub-area I and II (4 wells for injection and 9 extraction wells). Extracted vapors were conveyed to the treatment enclosure when the vapor flows are combined at a single-above ground manifold.

Approximately 80% of the combined vapors re-circulated for re-injection. Re-circulated vapor and O₂ generated at the treatment enclosure conveyed in separate piping back to the re-injection wells. The remaining approximately 20% not re-circulated flowed to an air-water separator and then to the vapor stream and treated by two vapor-phase carbon vessels connected in series.

Current field operations to install new wells and pipelines in addition to rebuilding a new manifold are underway. The new system of seven dual nested wells targets two depth intervals (35' and 45' below grade surface (bgs)) in the Pit-2 sub-area. A separate valve at the well-heads will be included in the pipeline for each depth interval for each set of wells. The SVE/IBT system will be operable remotely and is anticipated to operate at an extraction rate of 10 std. cubic feet per minute (SCFM) to the knockout drums. O₂ generation for the treatment system will be injected to the well-heads.

2. Electrical Enclosures and Panels (Properly rated and functional)

- ☒ Good condition ☐ Needs maintenance
☐ N/A

Remarks: The PLC and electrical panels are located within the SVE/IBT system enclosure. The process control system for the SVE/IBT system could be access remotely or via a computer located in the onsite trailer.

3. Tanks, Vaults, Storage Vessels

- ☐ N/A ☐ Good condition
☐ Needs maintenance ☐ Proper secondary containment

Remarks: Two 2,000 lb. vapor-phase carbon vessels appear to be in good condition. Vapor-phase carbon vessels operated in series to provide secondary protection against vapor breakthrough before change-out of carbon. The SVE/IBT system is currently offline during the field operations to install new wells and pipelines to the system. The enclosure and concrete pad appeared to be in good condition.

4. Discharge Structure and Appurtenances

☒ Good condition

☐ Needs maintenance

☐ N/A

Remarks: The treatment building is constructed on a concrete slab and surrounded by a 10-foot high chain link fence and locked gate. An overhead canopy prevents UV-damage to the equipment.

5. Monitoring Wells (Pump & Treat Remedy)

☐ Properly secured/locked

☐ Functioning

☐ Routinely Sampled

☒ Good condition

☐ All required wells located

☐ Needs maintenance

☐ N/A

Remarks: Many of the previous monitoring wells have been abandoned. The current ongoing field efforts are to install and tie-in new wells. The new wells appear to be in good condition, but require cutting to be tied into the system. Subsequent to cutting and tie in, C2 REM plans on locking the wells inside small metal enclosures to prevent tampering and damage.

D. Monitoring Data

1. Monitoring Data

☒ Routinely submitted on time

☐ Is of acceptable quality

Remarks: Monitoring data is submitted to the US EPA monthly and is compiled in annual OM&M Report.

2. Monitoring Data Suggests:

☒ Vapor plume is effectively contained

☐ Contaminant concentrations are declining

Remarks: Low VOC concentrations detected at the perimeter well suggest that soil vapors are not migrating beyond the cap boundaries.

XI. Overall Observations

A. Implementation of the Remedy

Describe issues and observations relating to whether the remedy is effective and functioning as designed. Begin with a brief statement of what the remedy is to accomplish (i.e., to contain contaminant plume, minimize infiltration and gas emission, etc.):

The implemented remedy at the Waste Pits OU consists of two main components – the RCRA-equivalent cap and the SVE/IBT System. The fundamental objective of the remedy is to prevent direct human contact with the contaminants, and to minimize the impact of the site contaminants to groundwater.

The RCRA-equivalent cap has proven effective in preventing human contact with contaminants in the waste pits and surrounding soil. Combined with the Cap-Gas Collection and Treatment System (CGTS), this component of the remedy has effectively prevented emission of contaminants by collecting and treating VOC vapors prior to release into the air. The cap and associated drainage system has also effectively prevented surface water infiltration which could potentially lead to further groundwater contamination. The cap remains in good condition, and the CGTS continued to remove VOC vapors from beneath the cap surface.

Following completion of the start-up testing, operation of the SVE/IBT System began in August 2006. A three month short-term operation period was used to ascertain the operational scenario for the SVE/IBT System. Since November 2006, the SVE/IBT system had operated 8 hours per day, Monday through Friday. During this operational period, the SVE/IBT System had performed at a level consistent with design parameters. During 2007, different operating scenarios were conducted to assess the optimal conditions for O₂ utilization. Results indicated that the highest average O₂ utilization occurred at a subsurface O₂ concentration of 15%. The O₂ generator operation subsequently was regulated based on maintaining a 15% O₂ level in the subsurface.

Beginning in June 2014 the system was turned off while C2 REM's field efforts drill, install, and tie-in new wells. The previous wells have been abandoned.

Through monitoring at the treatment enclosure as well as the vapor monitoring wells, the SVE/IBT System effectively captured, treated, and degraded VOCs beneath the waste pits through biodegradation and carbon treatment.

B. Adequacy of O&M

Describe issues and observations related to the implementation and scope of O&M procedures. In particular, discuss their relationship to the current and long-term protectiveness of the remedy:

Implementation of the O&M procedures have been consistent with the requirements outlined in the Waste Pits OM&M manual, with the exception of groundwater

monitoring. No major deviations from the scope and frequency of operation, maintenance, and monitoring at the SVE/IBT System and cap gas capture system have been noted (aside from the current activities and associated impacts). Monitoring data have indicated that the CGTS and SVE/IBT System have been operation and functioning as designed.

The cap continues to limit exposure to the waste pit contamination, and also limits surface water infiltration. Data collected from the perimeter wells indicate that migration of soil vapors beyond the cap footprint has been effectively controlled by the SVE/IBT System and CGTS. Monitoring data from operation of the SVE/IBT System have shown that the system has continually removed VOCs from the vadose zone through treatment and biodegradation.

C. Early Indicators of Potential Remedy Problems

Describe issues and observations such as unexpected changes in the cost or scope of the O&M or a high frequency of unscheduled repairs that suggest the protectiveness of the remedy may be compromised in the future:

None indicated in consideration of the radius of influence of the SVE/IBT System's extraction wells and positive results on treatment performance. Monitoring of groundwater concentrations is recommended to confirm that the ROD criteria are being met by the SVE/IBT System and CGTS.

D. Opportunities for Optimization

Describe possible opportunities for optimization in monitoring tasks or the operation of the remedy.

C2 REM is currently in the process of drilling, installing, and tying in new wells to the SVE/IBT System. Opportunities for optimization may present themselves after the new wells are tied in and operational.

Previous optimization testing was performed in 2007 to established the desired level of O₂ (15%) in the subsurface.

FINAL Trip Report
Del Amo Waste Pits Superfund Site, Torrance, California

1. INTRODUCTION

- a. Date of Visit: 14 November 2014
- b. Location: Torrance, CA
- c. Purpose: A site visit was conducted to visually inspect and document the conditions of the remedy, the site, and the surrounding area for inclusion into the Five-Year Review Report.
- d. Participants: *List all attendees*

Thad Fukushima, P.E.	USACE, Tech/Env Spt BrChief	thad.t.fukushige@usace.army.mil
Chay Tang	USACE, Tech/Env Spt BrEngineer	chay.c.tang@usace.army.mil
William White	C2 REM, Site Manager	wwhite@crrem.com
Seamus McGeough	C2 REM, Field Technician	smcgeough@c2rem.com

2. SUMMARY

Prior to the site inspection from approximately 0900-1130 hours, Dante Rodriguez of the U.S. Environmental Protection Agency (USEPA) provided background information to Thad Fukushima and Chay Tang of the U.S. Army Corps of Engineers (USACE). At approximately 1130 hours, Dante Rodriguez then departed the site. A site walk of the enclosed area (including currently offline remediation system) was conducted by Seamus McGeough, Thad Fukushima, and Chay Tang.

It was noted that field work was being conducted on site, including drilling/well installation and trenching for tie-ins to the remediation/sampling system.

3. DISCUSSION

On 14 November 2014, Thad Fukushima and Chay Tang departed the USACE office to Torrance, CA to meet with C2 REM and USEPA at the Del Amo Waste Pits Site. The weather was partly cloudy with cool temperatures (upper 60s F). The Site was accessed from Vermont Avenue, near the intersection of Del Amo Boulevard.

Thad Fukushima and Chay Tang arrived at the site at approximately 0900 hours and conducted a brief site walk with C2 REM and USEPA. The team inspected the condition of the cap, drainage features, and fencing. The SVE treatment system was not running, as new wells were being tied-into the system. Six of seven extraction wells installed had completed well-heads and valves, trenches had been excavated for tie-ins and previous SVE manifold was removed. Piping and manifolds will need to be installed with the new well connections and cages will need to be re-installed to protect the well-heads.

Following the site inspection, USACE and USEPA conducted a driving tour of the properties where ISCO, SVE, and capping will take place. Additional properties included those where

construction work was observed and samples may have been collected as part of the institutional controls for the site.

At approximately 1130 hours, Dante Rodriguez departed the site to provide USACE and C2 REM an opportunity to discuss current conditions and conduct the site inspection and interviews.

Seamus McGeough guided USACE on an in depth site walk to inspect site elements. Field operations were being conducted on site, including drilling, well installation, trenching, and piping to the remediation/sampling system. Due to recent lack of precipitation and water conservation efforts, the site was largely devoid of green vegetation. Seamus McGeough noted that the vegetation will regrow following sustained precipitation events. Irrigation pipe had been dismantled with the PVC currently on-site awaiting disposal.

The V-ditches were in good condition with minimal wear on connections between concrete sections. Seamus McGeough noted minimal to no erosion of the crowned sediment on either side of the V-ditches (crowned sediment to aid in runoff of precipitation into the V-ditches).

The gabion wall was in good condition, exhibiting minimal to no wear. C2 REM noted that the gabion walls had provided adequate stabilization of the sediment.

For the current field efforts, shallow trenches were open and awaiting tie-in pipelines to the newly installed wells. The vegetation in the area was removed and the previous manifold had been dismantled. The fenced in area of the remediation system was marginally cluttered with necessary equipment while field efforts continued.

The fencing appeared to be in good condition and Seamus McGeough noted security breaches onto the site have largely been eliminated by security fencing and motion activated lights.

The adjacent property on the North of the fencing appeared to be a large facility with shipping trucks and containers. The property to the West appeared to be an empty lot with vegetation. On the adjacent property along the adjoining fence on the West was a make-shift encampment built by a homeless man. Seamus McGeough noted that the resident of the make-shift encampment had not been noted to have trespassed onto the site. The East side of the site is bound by Vermont Avenue and the South side is bound by Del Amo Boulevard. No permanent residential buildings appear to exist adjacent to the site.

Following the site walk, USACE interviewed Seamus McGeough and William White of C2 REM regarding the activities & conditions of the site between the last 5-Year Review and present.

The site visit ended at approximately 1600 hours.

4. ACTIONS

The USACE will incorporate information obtained from the site visit into the Five Year Review report.

Thad T. Fukushige
Civil Engineer
CESPL-CD-TE

Chay Tang
Civil Engineer
CESPL-CD-TE

Site Visit Photos



1. Abandoned well near the gabion wall. The well abandonment may be incomplete as standing water was found in the well.



2. Gas-cap collection and treatment system. Located within the fenced remediation area.



3. Catch basin at the Eastern end of the South V-ditch. Minimal debris, but no blockage in flow was noted.



4. South V-ditch. Drainage has some debris, but no flow blockages were noted.



5. North V-Ditch and Eastern Catch Basin. Minimal debris, but no blockages noted.



6. Detail view inside a well vault.



7. Gabion retaining wall along Southern Edge of Cap. Appears to be in good condition.



8. Make-shift encampment along the adjacent (West) property's fenceline.



9. Previous manifold rack. Manifold had been dismantled and a new one will be constructed.



10. Dismantled manifold parts.



11. New piping for tie-ins to the newly installed wells.



12. Trenching – looking towards Vermont Ave.



13. O2 Generator and Buffer Tank for remediation system.



14. O2 generator for remediation system.



14. Survey monument.



15. PLC Panel for remediation system.



16. Site overview looking toward Vermont Ave.



17. Site overview, including new work.



18. PLC and electrical panels.



19. SVE IBT treatment system piping.



20. SVE IBT treatment system.



21. Temporary irrigation piping running along center of cap.



22. Trailer with security lights and security camera.



23. Treatment system.



24. Dual 2,000lb GAC units



25. URS Groundwater Storage Tank.



26. Site overview looking towards Vermont Ave from trailer.



27. View of fenced treatment pad housing system.



28. Site access road facing Vermont Ave.



29. View of SVE Well No. 2.

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Appendix F: Real Estate

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Title Review

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REVIEW OF TITLE EXCEPTIONS
DEL AMO FACILITY SUPERFUND SITE

This is a title review of portions of two tax parcels of land in the City of Los Angeles, California (Los Angeles County) in support of the Del Amo Facility Superfund site project. The tax parcels involved in this review are as follows:

- APN 7351-034-077 (*Fee ownership: Triton Diagnostics Inc.*)
- APN 7351-034-078 (*Fee ownership: Del Amo Landfill, LLC*)

Review performed May 18, 2015

Title Exception Number	Owner / Grantor Affected Parcels	Recording Information	Instrument Type and Rights Granted	Impact to Covenant to Restrict Use of Property, Environmental Restriction, Recording No. 00-1521450 & 05-1252930, recorded September 27, 2001 and May 27, 2005, respectively
A, B, C, D	Triton Diagnostics Inc APN 7351-034-077 APN 7351-034-078	Not Applicable	General and special taxes and assessments	None
1	Triton Diagnostics Inc APN 7351-034-077 APN 7351-034-078	Not Applicable	General water rights statement	None
2	Dominguez Water Corporation APN 7351-034-077 APN 7351-034-078	Book 2039, Page 63; recorded October 4, 1943	Quitclaim Deed conveying all property and interests to Defense Plant Corporation	None
3	Defense Plant Corporation APN 7351-034-077 APN 7351-034-078	Instrument No, 1 of Official Records, recorded date April 19, 1955	Dissolution of Defense Plant Corporation to Reconstruction Finance Corporation.	None
4	Shell Chemical Company APN 7351-034-077 APN 7351-034-078	Instrument No. 3338, recorded date October 1, 1971; Instrument No. 2922, recorded date July 27, 1972	Offer to dedicate and resolution to accept dedication for public street/highway	None – outside the boundaries of the current site property boundaries.

Title Exception Number	Owner / Grantor Affected Parcels	Recording Information	Instrument Type and Rights Granted	Impact to Covenant to Restrict Use of Property, Environmental Restriction, Recording No. 00-1521450 & 05-1252930, recorded September 27, 2001 and May 27, 2005, respectively
5	Shell Chemical Company APN 7351-034-077 APN 7351-034-078	Instrument No. 3339, recorded date October 1, 1971	Covenant and Agreement to Dedicate Land for Public Street Purposes	None – outside the boundaries of the current site property boundaries.
6	Shell Oil Company APN 7351-034-077 APN 7351-034-078	Instrument No. 3228, recorded date December 12, 1972	Easement and Right-Of-Way to Four Corners Pipeline Company to install, operate and maintain underground pipelines	Pipeline easement location is adjacent to the Restrictive Covenant cap location (<i>See Exhibit A, #6 for pipeline easement location</i>). Construction & maintenance within the easement by the Grantee, creates a potential risk for exposure to contaminated soils and groundwater.
7	Shell Oil Company APN 7351-034-077 APN 7351-034-078	Instrument No. 3229, recorded date December 12, 1972	Easement and Right-Of-Way to Mobil Oil Corporation to install, operate and maintain underground pipelines	Pipeline easement location is in close proximity to the Restrictive Covenant cap location (<i>See Exhibit A, #7 for pipeline easement location</i>). Construction & maintenance within the easement by the Grantee, creates a potential risk for exposure to contaminated soils and groundwater.
8	Shell Oil Company APN 7351-034-077 APN 7351-034-078	Instrument No. 5058, recorded date December 15, 1972	Lease of real property to International Property Development. Lease term not to exceed 3/31/1997 (Instrument No. 5050 recorded date December 15, 1972)	Lease terminated 3/31/1997, however pipeline easement was reserved by Grantor (<i>See Exhibit A, #8 for pipeline easement location</i>). Construction & maintenance within the easement by the Grantee, creates a potential risk for exposure to contaminated soils and groundwater.

Title Exception Number	Owner / Grantor Affected Parcels	Recording Information	Instrument Type and Rights Granted	Impact to Covenant to Restrict Use of Property, Environmental Restriction, Recording No. 00-1521450 & 05-1252930, recorded September 27, 2001 and May 27, 2005, respectively
9	Cadillac Fairview/California, Inc. APN 7351-034-077 APN 7351-034-078	Instrument No. 77-338683, recorded date April 4, 1977	Non-exclusive easement granted to Southern Pacific Transportation Company for railroad, transportation and communication purposes.	Non-exclusive railroad easement runs through Restrictive Covenant cap location (See Exhibit A, #9/10 for railroad easement location). Construction & maintenance within the easement by the Grantee, creates a potential risk for exposure to contaminated soils and groundwater.
10	Cadillac Fairview/California Inc APN 7351-034-077 APN 7351-034-078	Instrument No. 77-338683, recorded date April 4, 1977	Non-exclusive easement granted to Golden Eagle Refining Company for railroad drill track, transportation, communication and storm drainage purposes. Non-exclusive easement to be shared with Southern Pacific Transportation Company (Exception #9)	Non-exclusive railroad easement runs through Restrictive Covenant cap location (See Exhibit A, #9/10 for railroad easement location). Construction & maintenance within the easement by the Grantee, creates a potential risk for exposure to contaminated soils and groundwater.

Exceptions exclusive to APN 7351-034-077

Title Exception Number	Owner / Grantor Affected Parcels	Recording Information	Instrument Type and Rights Granted	Impact to Covenant to Restrict Use of Property, Environmental Restriction, Recording No. 00-1521450 & 05-1252930, recorded September 27, 2001 and May 27, 2005, respectively
11	Cadillac Fairview/California, Inc. APN 7351-034-077	Instrument No. 83-375486, recorded date April 5, 1983	Covenant and Agreement to hold property as one parcel, Cadillac Fairview/California, Inc.	Parcel boundary adjustment includes Restrictive Covenant cap (<i>See Exhibit A, #11 for parcel boundary adjustment location easement location</i>). APN 7351-034-077 must include the area identified as #11 in any future real estate conveyance. Competing realty interests could create a potential risk for exposure to contaminated soils and groundwater, which must be managed accordingly.
12	Cadillac Fairview/California, Inc. APN 7351-034-077	Instrument No. 83-512500, recorded date May 9, 1983	Easement granted to Western Waste Industries for vehicular and pedestrian ingress and egress.	Vehicular/pedestrian easement is located within Restrictive Covenant cap location (<i>See Exhibit A, #12 for easement location</i>). Construction & maintenance within the easement by the Grantee, creates a potential risk for exposure to contaminated soils and groundwater.
13	Triton Diagnostics, Inc. APN 7351-034-077	Instrument No. 99-1453930, recorded date August 3, 1999	Notice of EPA order to owner regarding the Unilateral Remedial Action, which affects APN 7351-034-077.	None – it is the notice of a Restrictive Covenant being placed on the property.
14	Triton Diagnostics, Inc. APN 7351-034-077	Instrument No. 00-1521450, recorded date September 27, 2000	Covenant restricting use of property - Specifically restricts use of property for the following: a) Residential Human Habitation b) Hospital for humans c) Public or private schools for persons under 21 years of age d) Day care center for children	This is the referenced covenant for APN 7351-034-077

Title Exception Number	Owner / Grantor Affected Parcels	Recording Information	Instrument Type and Rights Granted	Impact to Covenant to Restrict Use of Property, Environmental Restriction, Recording No. 00-1521450 & 05-1252930, recorded September 27, 2001 and May 27, 2005, respectively
15, 16	Triton Diagnostics, Inc. APN 7351-034-077	Not Applicable	General Title Statements	None

Exceptions exclusive to APN 7351-034-078

Title Exception Number	Owner / Grantor Affected Parcels	Recording Information	Instrument Type and Rights Granted	Impact to Covenant to Restrict Use of Property, Environmental Restriction, Recording No. 00-1521450 & 05-1252930, recorded September 27, 2001 and May 27, 2005, respectively
11	Cadillac Fairview/California, Inc. APN 7351-034-078	Instrument No. 83-375484, recorded date April 5, 1983	Covenant and Agreement to hold property as one parcel, Cadillac Fairview/California, Inc.	Parcel boundary adjustment includes Restrictive Covenant cap (<i>See Exhibit A, #11 for parcel boundary adjustment location easement location – this same adjustment applies to APN 7351-034-078</i>). APN 7351-034-078 must include the area identified as #11 (078) in any future real estate conveyance must adhere to the boundary line adjustment, as recorded in Instrument No. 83-375484. Competing realty interests could create a potential risk for exposure to contaminated soils and groundwater, which must be managed accordingly. (<i>See Exhibit A, #12 for easement location</i>).
12	Cadillac Fairview/California, Inc. APN 7351-034-078	Instrument No. 83-512499, recorded date May 9, 1983	Easement reserved for railroad transportation and communication.	Construction & maintenance within the easement creates a potential risk for exposure to contaminated soils and groundwater.
13	Del Amo Landfill, LLC APN 7351-034-078	Instrument No. 15-1252930, recorded date May 27, 2005	Covenant restricting use of property - Specifically restricts use of property for	This is the referenced covenant for APN 7351-034-078

Title Exception Number	Owner / Grantor Affected Parcels	Recording Information	Instrument Type and Rights Granted	Impact to Covenant to Restrict Use of Property, Environmental Restriction, Recording No. 00-1521450 & 05-1252930, recorded September 27, 2001 and May 27, 2005, respectively
	APN 7351-034-078		the following: a) Residential Human Habitation b) Hospital for humans c) Public or private schools for persons under 21 years of age d) Day care center for children	
14	Del Amo Landfill, LLC APN 7351-034-078	Instrument No. 05-1769001, recorded date July 26, 2005 and Instrument No. 20121117518, recorded date July 27, 2012	Memorandum of Easement and Access Agreement granted to Montrose Chemical Corporation (Montrose)	None
15, 16	Del Amo Landfill, LLC APN 7351-034-078	Not Applicable	General Title Statements	None